

COMPUTERWORLD

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What's Yours Is Ours: New IBM SE Contract

By Peter L. Briggs
And Ronald Frank
CW Staff Writers

— Excerpt from new IBM
contract with users for services
of systems engineers

"...[I]t is agreed that no idea, concept, know-how, or technique relating to data processing shall be deemed confidential. To the contrary, IBM shall be free to use and disclose any such information during the course of this agreement and thereafter in any way which it may deem to be appropriate."

IBM's new contract for users who want to hire systems engineers (SEs) under the new separate-pricing schedule states: "Any original material, either written or readable by machine, prepared for the customer by IBM under this agreement shall be a work made for hire and shall belong to the customer."

Then it goes on to state: "The customer, however, grants to IBM an irrevocable, non-exclusive, unrestricted, worldwide, and royalty-free license, with the unrestricted right to sublicense others, with respect to all such material and under any discoveries, ideas, inventions, or improvements disclosed therein and made solely by IBM employees or jointly by IBM employees and customer personnel. Such licenses and rights shall

also extend to all statutory forms of protection obtained thereon."

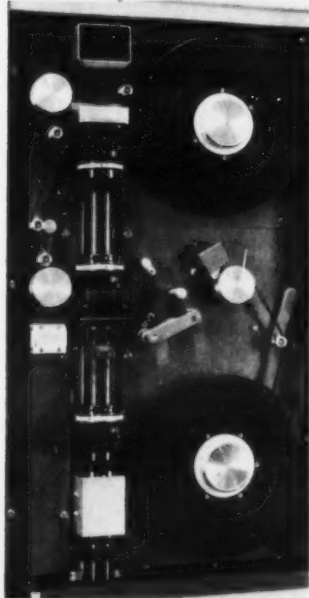
Customers Disturbed

CW contacted some large customers who have used the SE service in the past. The universal reaction was one of extreme unhappiness and lack of willingness to enter into any such agreement. "No user would permit IBM SE assistance for a

unique application, if IBM reserved the right to pass on the software to other companies, including competitors!" one user told CW.

Another major user pointed out that whenever he hires consultants to perform work for him, the standard agreement leaves all rights to such information in the hands of the customer, not the consulting firm. He would never consider allow-

(Continued on Page 4)



Laser optical train of the new recorder with the protective covers removed.

Up to 180,000 bits/in

Laser 'Tape Drive' Records on 8mm Film

By A.B. Williams
CW Staff Writer

EAST NATICK, Mass. — A laser "tape drive" with a peak packing density of 180,000 bits/in. and a recording rate of up to 21.6 million characters/sec is expected to be ready for customer shipments within six months, according to the firm that will market it.

The device, which makes permanent recordings on 8mm film, was developed by Sylvania Electric Products, Inc. The laser recorder will be marketed by Synergistics, Inc., which has acquired the product line and patents in a cash and stock transaction. Synergistics has a working model of the recorder, a

spokesman for the firm said.

The device is intended for digital recording, but can also be used for low-frequency analog applications. It is currently operating on the Honeywell DDP-516, but Synergistics expects to be able to deliver IBM 360-compatibility within one year.

The new system operates much as a magnetic tape unit, recording on 36 channels, instead of the more usual 7 or 9. As with other announced laser recording devices, it is for archival use; the information, once recorded, cannot be changed.

The channels can be used singly, recording serially, or in parallel operation, in any combina-

tion producing not more than 36 discrete channels. Thus it is possible to record three channels of 12-bit words, four channels of 9-bit words, or other combinations, including check bits, if desired.

Peak recording density is

180,000 bits/in. on each channel, but data can be recorded (presumably from existing files) at conventional tape densities, such as 800 bits/in. The latter capability will enable use by conventional computer channels

(Continued on Page 4)

3 New Features Increase The Capabilities of Adpac

SAN FRANCISCO — A new version of the Adpac proprietary language includes three major enhancements — a new linkage editor, a self-relocating compiler, and device-independent I/O modules.

For Disk Operating System users, the addition of the self-relocating capability and the new linkage editor permit Adpac programs to be operated in either the foreground or the background and in any sub-partition. This capability allows the testing of compiled programs in the foreground, minimizing the machine usage during testing.

With an average compile time of under one minute, including the linkage editor, Adpac Computing Corp. claims that the

foreground can be used for many testing functions normally reserved for background operation, and which therefore consume valuable time.

Less Core for Tape and Disk

Tape and disk files also require less core during execution, according to William R. Gough, company vice-president, and a 5% reduction in the time required for execution of the assembly language I/O modules has been achieved.

Device independence allows the user to operate without assigning a specific device, a technique long available through the use of the full Operating System. Thus, if a device is not available, the program can run on an alternate device without changes.

Data Bank Will Track 300,000 Children

By Joseph Hanlon
CW Staff Writer

LITTLE ROCK, Ark. — A national data bank with records of 300,000 migrant children is being set up here. Access to the data will be unrestricted.

The system is designed to aid the rapid placement of children in school. Using a Wats line, a school official will be able to call the Little Rock center free of charge and get the school and

health records of the child. With this system, "the child can be placed immediately," according to Joe Miller, newly appointed director of the Data Bank for Migrant Children.

According to Miller, building of the data base will begin in November, and the system will be operational in April, 1970.

Access Unrestricted

When asked who had access to the data, Miller replied: "Well, I suppose anyone." Asked if there were any restrictions on the use of the data, he said: "Well, I wouldn't think so."

None of the information in the data bank could be used in a derogatory way, Miller said. Personal information, such as questions about the family and their moral habits, has been excluded, he explained.

But he said that the file contained an "extensive" record of tests and health information, including the child's "strong and weak points" in school.

Federal Project

The data bank is being set up

by the federal programs division of the Arkansas Department of Education under a \$426,150 grant from the U.S. Office of Education. School and health records of 300,000 children of migrant farm workers will be stored in the CDC 3300 at the University of Arkansas Medical Center. Present funding will allow the data bank to operate only until June, 1970, but Miller hopes that the project will be extended.

Data will come from files of "record-transfer forms" maintained by the 47 state directors of migrant education. Beginning this fall, copies of these files will be mailed to Little Rock for keypunching and insertion into the data bank. Each state director will continue to handle his own records manually.

According to Miller, the data bank can be updated each time the child moves.

Miller was previously Arkansas state director of migrant education and until 1967, served as superintendent of schools at Mountain Pine, Ark.

Japan to License EDP Personnel

TOKYO — The Ministry of International Trade and Industry (MITI) has established regulations for the licensing of information processing engineers.

The regulations were published by the ministry's Notification No. 366, effective July 16, 1969.

The regulations give official sanction to the information processing engineering profession, which it is hoped will assist the development of the industry.

According to the regulations,

an information processing engineer is anyone capable of performing either system analysis, system design, program design, or programming for information adjustment, processing, filing, retrieval, or other functions of electronic computers.

MITI intends to issue two classes of licenses to qualified engineers who pass examinations which will be conducted once a year by the MITI.

No further information was immediately available.

On the Inside

Compatible Equipment
Can Save Users Money
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'Byte Fortran' Aids
1130/360 Conversion
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Contract Services Ruled Immune to Punitive Damages

By Ronald Frank
CW Staff Writer

LOS ANGELES — In a reversal of a previous decision, the Los Angeles Superior Court has ruled that under state law, a service bureau customer cannot claim punitive damages for services covered by contract.

However, related claims for punitive damages, based on charges that the customer was denied access to magnetic tape files, have not been affected and will come to trial.

Since California law prohibits

punitive damage claims for contract items, the ruling by Judge Robert W. Kenny on July 25 qualified, but did not dismiss, the right of Southern California Retailers Credit Service Co. to bring suit against Statistical Tabulating Corp., a local service bureau with headquarters in Chicago.

Retailers Credit processes over 120,000 customer statements and related credit data monthly for 80 firms, including department stores and other consumer credit-granting businesses in the

greater Los Angeles area.

As part of the claim, Retailers Credit alleges that Statistical Tabulating was unable to provide certain services that included daily data pickups, monthly billing to customers, and the issuing of credit cards.

Initially, according to the court papers, Statistical Tabulating was processing the Retailers Credit accounts on an IBM 1440 system. A subsequent upgrade to System/360 led to problems that caused Statistical Tabulating to declare that it desired to cancel the contract between the two parties.

At this point, Retailers Credit alleges that it was unable to get possession of the 360 programs and the magnetic tape files from Statistical Tabulating.

According to Warren Wolfe,

attorney for Retailers Credit, his client was forced to reconstruct a workable data base by reverting to its 1440 files, after the termination of the contract.

Statistical Tabulating, through its attorney, Wendell Will, has stated that upon realizing that difficulties existed in handling the Retailers Credit data, the service bureau offered to credit its customer for a portion of the services.

In quoting from the court file, Judge Kenny said that the question of ownership of the tapes would be of prime importance when the case comes to trial. In May, Judge Kenny denied a summary judgment petition by Statistical Tabulating that would have obviated the plaintiff's charges.

At that time, Judge Kenny

ruled that punitive damages could be claimed for both programs and tapes in addition to other charges. On July 25, however, he stated that punitive damages could not be claimed for the programs, since these were an item covered under the contract that existed between the two parties.

The Retailers Credit suit asks for \$2 million, \$1 million of which is being claimed as compensatory damages for loss of business. In addition, \$500,000 is being claimed as punitive damages for the tapes. Statistical Tabulating has filed a 57-page counterclaim to the allegations, according to the court files.

Because of congested dockets in Los Angeles County, the case is not expected to come to trial until next year.

Users May Lose Access to Files

LOS ANGELES — The specter of a service bureau customer being denied access to his own records has become a distinct possibility, according to a California Superior Court judge.

In a personal opinion that could be of vital importance to service bureau users, Judge Robert W. Kenny told CW that the question of ownership of data is a crucial matter in a business relationship between service bureaus and their customers.

In citing a related case now pending before the courts of Los Angeles County, Judge Kenny stated that the users contracting for service bureau time could protect themselves, however.

"In order to retain the right of access to his records," he said, "a user should insist on a no-cancellation clause as part of any agreement he has with a servicer of this type."

In the absence of this type of agreement, the judge said that the termination of a contract by either party could conceivably result in a service bureau effectively impounding a user's files.

Although he admitted that this type of problem should not normally arise when both user and service bureau enjoy a viable working relationship, the judge recognized that potential loss of data even for a short period could be crucial for a customer.

"Although it would be prudent for the user to insist on a quite restricted contract which specifically details ownership and access to all data, probably the best safeguard would be for the

service bureau customer to maintain a complete set of in-house duplicate files," Judge Kenny said.

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New Laser 'Tape Drive' Records on 8mm Film

(Continued from Page 1)

which do not have the power to handle the peak data rates.

The new unit runs at either 60 or 120 in./sec, thus producing transfer rates ranging from those now quoted for reasonably fast magnetic tapes up to 10.8 or 21.6 million char/sec.

Reel capacities are impossible to state in terms of characters, since they will vary widely, depending on recording method and character (word) size. A prospective user can start from the basic capacity of 4.3 billion

bits (on a 10-1/2 in. reel) and plot his own channel formats, densities, etc.

There is one catch: the user must not expect very fast access to data stored on this device. At 120 in./sec, a 2,000-foot reel moves quite slowly, giving an average access time of 100 seconds.

The company, located at 10 Tech Circle here, states that the price of the basic unit (not including such features as buffering and control at the computer, parity check and clock channel) is \$65,000.



The laser recorder looks, on the surface, like a tape drive.

New Technique: Magnetic Bubble Storage System

MURRAY HILL, N.J. — A radically new technology that someday may utilize tiny magnetic bubbles for data storage and processing was announced by Bell Telephone Laboratories last week.

The bubbles are actually locally magnetized areas that can move about in thin plates of magnetic material. The bubbles can be created, erased, and moved anywhere in the thin plates, without interconnection. They can also be controlled to interact and their presence or absence can be detected, suggesting such applications as logic, memory, or switching.

Although the concept is revolutionary in nature, a company spokesman conceded that actual commercial applications were "still five years or more away."

The energy needed to manipulate the bubbles can be applied either by conductors or from microscopic ferromagnetic antennae that are printed in patterns over the surface of the magnetic material.

The new technology is based on ortho-ferrites, which are magnetic materials composed of rare iron oxides and first grown as crystals by Bell Labs.

When a magnetic field of critical value is applied to an ortho-ferrite, almost perfectly formed magnetic bubbles are produced. The bubbles can be moved at high speeds on sheets of ortho-ferrite material.

What's Yours Is Ours: New IBM SE Contracts

(Continued from Page 1)

ing such a firm to have rights to proprietary materials obtained while it was being paid by his company.

IBM reserves the right, under the contract clauses, to allocate personnel as it sees fit, with no regard for customer desires. This means that the customer has no say over who does the work for him, and even includes the fact that IBM may withdraw someone from his installation and put him into another installation doing the same work for a competing firm.

An officer of one consulting firm told CW, "We could never allow ourselves to be involved in this kind of a contract. No one would ever hire us, nor would we ever get the legal problems straightened out. If we send someone into a shop, we cannot just take him out and replace him, without the customer blowing his stack!"

"They [IBM] can make a fortune on the few firms that will hire them. They have their cake and eat it too. You pay them to develop your software, then they go out and sell it to other clients for the same price you have already paid. Not a bad profit there!"

With regard to the confidentiality of the customer's business operations and related information, IBM has included a protection phrase in the contract: "With respect to financial and statistical data relating to the customer's business which is confidential, is clearly so designated, and which is submitted to IBM personnel by the customer in order to carry out this agreement, IBM will instruct its personnel to use the same care and discretion that they use with similar information which IBM designates as confidential."

As one irate user put it, "Anyone who has ever handled — and there are many of us — documents that have been marked 'IBM Confidential' will have a clear idea of the amount of — or lack of — security associated with the distribution of such documents. I don't want my company's business records cir-

culated to the members of Share, or even to IBM."

IBM Comment

IBM made the following statement when asked for comment.

"With the agreement for IBM systems engineering services, IBM has not changed its relationship with regard to customer's confidential information. IBM will continue to make every effort to protect its customer's confidential data.

"The systems engineering service is offered to assist customers in the accomplishment of their data processing activities; therefore, the customer retains full rights to the work.

"While making every effort to protect customer's confidential information, IBM does retain the option — based upon the nature of systems engineering activities — to apply similar techniques in order to advance data processing in general."

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These Programmers Go Up in the Air To Solve Down to Earth DP Problems

BURBANK, Calif. — There's a new breed of computer programmer winging his way around the U.S. these days.

Although the designation isn't official, the new occupational type is known as the "flying programmer" at Univac's federal systems division.

The new programmer got off the ground about seven years ago at Johnsville, Pa., when the U.S. Navy started its A-New program, an effort aimed at developing a better antisubmarine warfare (ASW) aircraft.

The Navy loaded certain electronics equipment, including Univac computers, aboard the research and development aircraft, and the fledgling programmers naturally went along — not for the ride — but to work.

Since that time and the Navy's acceptance of the P-3C Orion antisubmarine warfare aircraft, manufactured by the Lockheed-California Co., more than 30 men have joined the ranks of the semiofficial Univac Flying Programmers Club.

"In those early days, several of the men chalked up a lot of flying hours," the Univac spokesman said. "One of them, Gerry Butenhoff, now has nearly 1,000 hours of flying time."

Two current members of the flying programmers team that takes off from Lockheed facilities in Burbank, Calif., are Gerald A. Nickell and Ronald J. Tomsich.

Flying is not new to Nickell, 28, a native of Turtle Lake, Wis., and a Univac employee for two

years. He spent four years in the Navy as an aviation electronics technician and logged about 1,500 hours on S2Fs, a twin-engine antisubmarine warfare aircraft.

But for Tomsich, 25, a native of Ely, Minn., the P-3C is the first noncommercial flying venture.

To qualify for flying programmer status, they had to pass a stringent physical and be "some pretty sharp troops," according to a company spokesman.

Nickell and Tomsich — they average about 25 hours of flying a month and draw company flightpay for it — work on testing and debugging new programs for the Univac ASQ-114 while the P-3C aircraft is performing certain maneuvers, some at extremely low altitudes, over the Pacific Ocean.

Univac is building the ASQ-114 computer under a \$13.6-million contract with the Naval Air Systems Command.

The microelectronic computer, which has the problem-solving capabilities of a large commercial machine but is many times smaller, is the primary data processor for the P-3C's sensory, fire control, and supporting electronic subsystem.

Tomsich, a 1967 graduate of the University of Minnesota, and Nickell, who graduated the same year from River Falls (Wis.) State University, helped write the programs for the ASQ-114.

Their programs, they said, are primarily concerned with analyzing data gathered on submarine search missions.

"If any problems appear on the program, we're there to locate and solve them," Tomsich explained.

The programmers wear business suits on the flights. Other than that, they are treated as regular crew members and go through the same procedures, such as preflight briefing, de-



The flying programmers take off in their P-3C Orion for another day of work.

briefings, etc.

Some of the flights are long, and most of the time is spent standing. There are few opportunities to take a break, Tomsich said.

Even when the aircraft is on the ground, the programmers are aboard, testing their programs. When they're not on the plane, they're working in a special programming simulation laboratory at Lockheed facilities.

"The time goes fast for us, but the wives aren't too thrilled with the hours we put in," Nickell said.

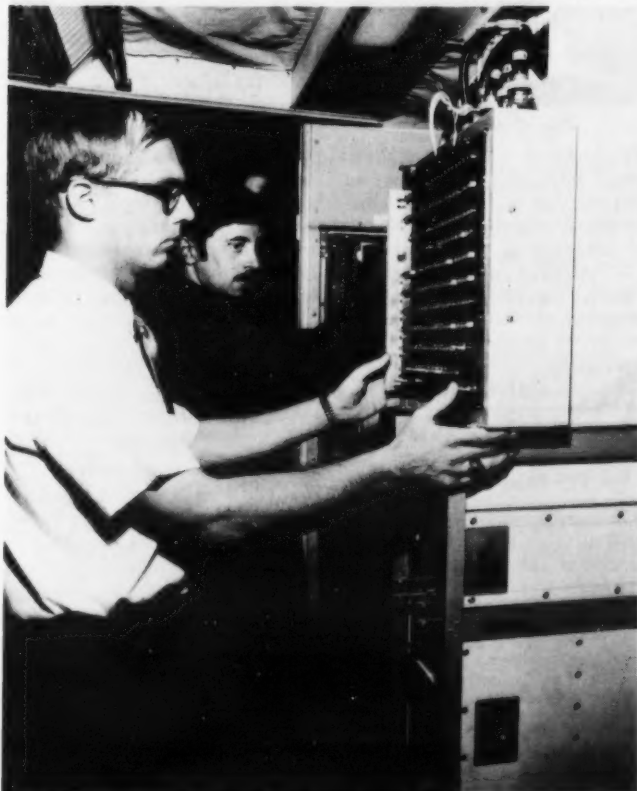
A company spokesman put it another way: "It's no joke when they say the aircraft is 'their second home,' because it does see more of them than their families do."

Both programmers, however, view their work as rewarding. The reason, Nickell said, is that "we can see the end results of our work."

Most programmers, he said, work in a quiet office and never get to see the end result of their work or the computer they're working on.

However, flights do take on an office-like routineness when they're flown daily. "But we had parachute drill one day and that was enough to snap me out of the office-routine thing," Tomsich said.

Experienced flier Nickell wasn't too concerned, however. "There's nothing to it — as long as you've got your feet on something solid."



Thomas P. Kratz and Ronald A. Barsness monitor operation of the ASQ-114 computer during a test flight. Kratz has his hands on the maintenance control panel.



Members of the flying programmers team include (left to right) Ronald J. Tomsich, Ronald A. Barsness, Thomas P. Kratz, Gerald A. Nickell, and Gary A. Ronneberg.

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Software-Controlled Drafting Gives User Flexibility

SOUTH WINDSOR, Conn. — A low-cost, automatic drafting system consisting of a table and stored program control has been introduced by Gerber Scientific Instrument Co.

Called System 723, and including a high-speed automatic drafting system together with operating software, the complete package is priced at less than \$60,000.

Application areas include general-purpose data plotting, cartographic, machine-tool tape verification, electronics, civil en-

gineering, aerospace, shipbuilding, oceanography, automotive, architectural, land development, and power utility industries.

System 723 is said to be the first system of its size to use a stored program rather than the conventional hardwired design. It is, therefore, possible to change the basic operating capabilities of the system to meet new performance demands through simple software changes rather than more complex and less flexible hardware changes. When not controlling the draft-

New Products

ing machine, the computer's full memory capacity is available for use in off-line computing applications.

The firm is located here at 83 Gerber Road.



Drafting System



Data Terminal

Data Terminal

A new modular terminal for remote batch or interactive data processing has been developed. Said to be compatible with practically all computers now marketed, the terminal accepts input from punched cards, marked cards, magnetic tapes, tape cassettes, paper tape, and keyboard-entered data.

Transmission rate, using the terminal to a main data center is typically 4800 bit/sec duplex mode using a dedicated line or 2,000 bit/sec on conventional dial phone networks. Operation at faster speeds can be provided for special applications.

A complete turnkey system is offered, including programming for initial operation. Custom software is also available.

Up to 128 full-duplex or 256 half-duplex remote I/O stations can be accommodated using the DSD-8 terminal as a line concentrator or time division multiplexor.

Model DSD-8-01, the most economical modular terminal, utilizes a 4K word memory in the controller, an Inktronic printer operating at 120 char/sec, a 300-card/min card reader, an automatic send-and-receive



Mini-Processor

teletypewriter printer and keyboard, with paper tape input and output, and a full-duplex line coupler for transmission at up to 19,200 bit/sec.

All required interface equipment is available, and delivery of terminals can be from stock or up to 90 days, depending on application.

The manufacturer is Data Systems Design, Inc., 2055 Center St., Berkeley, Calif.

GE Mini-Processor

GE's new mini-processor, the GE-Pac 30, features a selling price that starts at under \$10,000.



Communications Terminals

The new models are process computers, built around read-only memory. Typical applications include testing of electronic components, loading terminal automation, instrument control, and subsystem control.

Instructions can be either 16 or 32 bits in length, with direct addressing to 64K. The company says that modular construction and plug-in boards facilitate service and maintenance.

There are two models. The GE-Pac 30-1 is smaller and highly flexible, while the -2 is said to be more powerful at the user level.

Peripherals include teletypewriters, high-speed paper tape units, and a card reader, with bulk memory planned for later this year.

Details are available from General Electric, Process Computer Dept., Phoenix, Ariz.

Communications Terminals

Two recently announced communications terminals featuring the ability to use lines either with or without coupling devices have been recently announced.

Model DF33ASR-0 is a no-coupler device that uses a direct connection to a standard telephone line.

Designed for applications including time-sharing, terminal-to-terminal communications, and computer access, the terminal transmits and receives 100 word/min.

Error-free transmission is said to be assured by using a fully filtered data set that rejects harmonic and spurious signals.

The unit is compatible with the Bell 103A data set and is priced at \$1,550.

The Model DF33ASR-1 allows hardware and acoustical coupling to standard telephone lines. Speed is also 100 word/min, and the unit is compatible with Bell 102 data phones.

The terminal is priced at \$1,595. Both terminals are stock items available for immediate delivery.

Data Access Systems, P.O. Box M418, Landing, N.J. 07850.

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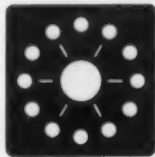
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Erasable Holograms Herald Complete Laser Memories

NEW YORK — Development of a technique for producing holograms that can be erased magnetically has been reported by RCA.

The holograms — called phase holograms — are produced on a special magnetic surface through the interaction of both the heat and light inherent in a laser beam.

Airlines Invest \$83.3 Million In 52 Simulators

WASHINGTON, D.C. — Ten member airlines have \$83.3 million invested in 52 flight simulators for pilot training, according to a survey by the training committee of the Air Transport Association (ATA). These same airline members of the ATA training committee plan to add 20 more simulators by Jan. 1, 1972, for an additional investment of \$53.9 million.

Flight simulators have the cockpit, instruments, and controls of an airplane, with a computer that makes them behave as they would in a real airplane. Thus, a flight simulator is able to reproduce the performance sensations experienced in a specific type of airplane. Airlines use flight simulators to train pilots to fly new aircraft or for recurrent checks of their proficiency on aircraft they already are qualified to fly.

Because simulators provide safer and more effective training, the airlines and FAA are working to do more training in simulators, less in aircraft. This trend is being speeded up by the use of visual attachments that allow the pilot to see a dynamic display of the airport and the runway through the window of his simulator cockpit. Simulators with visual capability can be used for training in landing and take-off — normal and emergency procedures — as well as in low-visibility landings.

John A. Walker, chief training pilot for Pan American World Airways and chairman of the ATA training committee, singled out the accelerated use of visual attachments as one of the most significant trends disclosed by the survey.

"There are now 16 simulators with visual capability," Walker said, "which is double the number in use by committee members two years ago. By 1972, with the planned addition of visual capability to 16 simulators now in use, we will again double our visual capability. Also, 16 of the 20 new simulators that committee members plan to add to their training bases by 1972 will have visual capability."

This total of 32 new visual attachments the airlines plan to install by 1972 represents an investment of \$12.8 million.

The new technique could make possible an optical computer memory able to store 100-million bits of data in a film one-inch square that could be read out, erased, and reused repeatedly, according to Dr. William Webster, vice-president, RCA Laboratories, Princeton, N.J.

That capacity compares with present experimental techniques based on the use of photographic film or similar photosensitive materials that cannot be erased because they undergo permanent chemical changes when exposed to light. These can be changed or updated only by removing them and inserting a fresh film, a very slow process, he noted.

By contrast, he said, the new technique makes it possible to

"write" information into a magnetic film in 10 billionths of a second and to erase it in 20 millionths of a second.

Reuben S. Mezrich, who developed the technique under the direction of Dr. Jan A. Rajchman, staff vice-president, Information Sciences, described it as follows:

An extremely thin film of manganese bismuth, a magnetic material, is deposited in a single-crystal layer two-millionths of an inch thick on a base of mica. The film is then subjected to a strong magnetic field that forces all its magnetic atoms to line up with their north poles in one direction, their south poles in the other.

Next, the light from a pulsed laser is split into two beams, one going directly to the film and

the other going first to the information bit pattern to be recorded and then to the film.

At those points where the two beams interfere constructively (add their powers together) the heat from the laser beams warms the magnetic material sufficiently to allow its magnetic atoms to realign themselves so that the north poles of those in the heated portions now point in the same direction as the south poles in the unheated portions. Where the two beams interfere destructively (tend to cancel each other) nothing happens.

Thus a magnetic pattern is created in the film that corresponds to the interference pattern created by the converging laser beams, and a magnetic hologram is born.

The magnetic hologram can be read out in two ways, he said, either by transmitting a laser beam through it or by reflecting the beam from it.

Finally, the hologram can be erased simply by electronically pulsing a nearby wire coil that subjects the film to a strong magnetic field and forces the magnetic atoms to line up, as at first, with all north poles in one direction, all south poles in the other.

The speed and ease of making and erasing magnetic holograms, coupled with the fact that their resolution (2,000 line/millimeter) far surpasses that of ordinary photographic materials, make the process extremely attractive for achieving an optical computer memory, RCA said.

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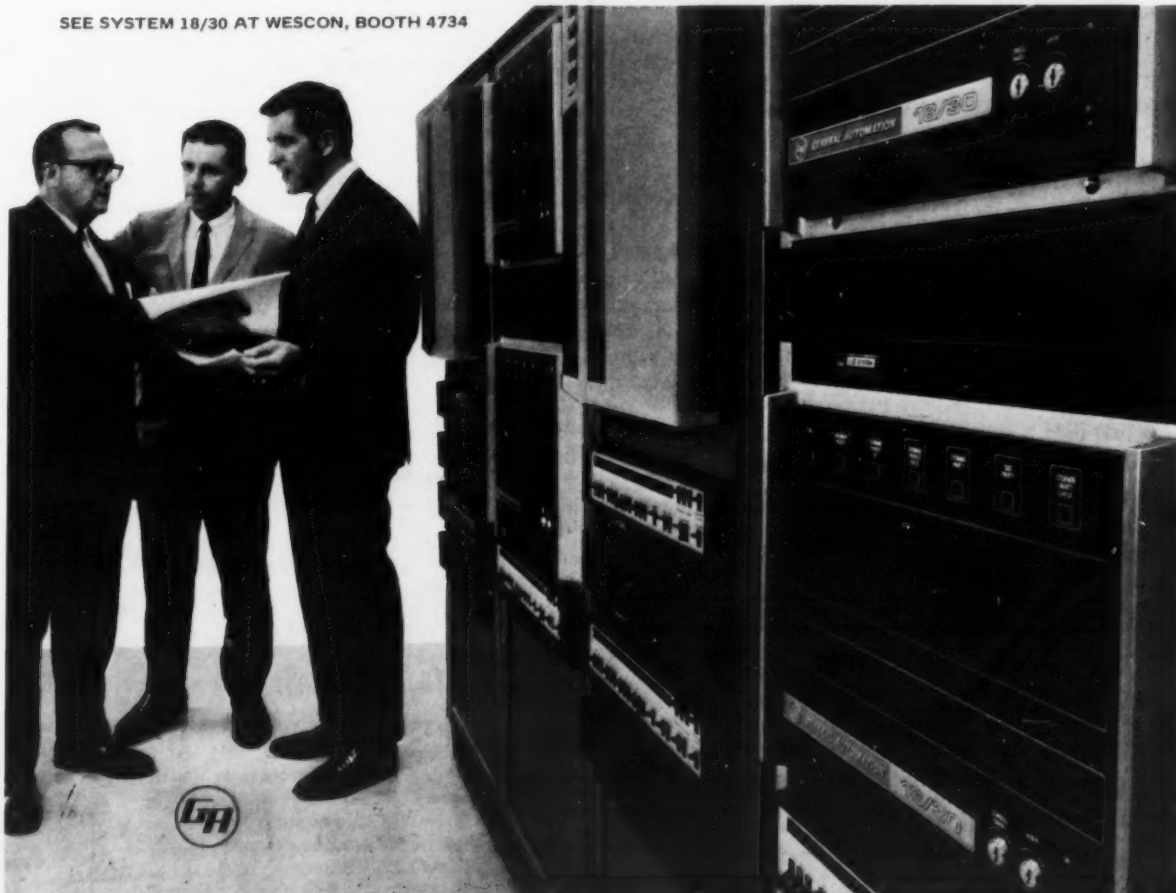
grams can be accomplished quickly, economically, and on a fixed price basis.

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Today

Editorials

March of Technology

Developments in the state of the art continue to come quickly. In this issue we have stories on a new laser "tape drive," the development of erasable holograms, and the discovery of "magnetic bubbles," a technology so new that its uses can only be guessed at.

Meanwhile, back in the input section, thousands of operators are still keying data onto cards, tapes, and disks. Technology has reduced these people to mechanical cogs in an electronic "automated" world. Thank God for the inherent patience of women. Otherwise, we never would get this work done.

It's the old question: Should technology serve man or itself?

What the EDP world really needs now a lot more than a \$65,000 laser "tape drive" is a good, inexpensive optical character reader.

Data Banks Revisited

Despite repeated dire warnings, the national data banks continue to multiply.

Now it's a national data bank to hold the records of 300,000 children of migrant farm workers. And not a safeguard in sight.

The problem appears to be that well-meaning public officials don't recognize the difference between maintaining 300,000 records in file drawers and storing them on tapes or disks.

But, as all DP people know or should know, the difference is extreme. With computerized files, it is possible to sort the records on any number of fields. Data that would take years to retrieve by sorting the files manually can be retrieved in minutes or hours with a computer.

This ability to manipulate the files isn't necessarily bad. But it calls for the most stringent safeguards to prevent misuse of data and to protect personal privacy.

There have been calls in both the U.S. and Canada for the appointment of ombudsmen to watch over data banks.

Such protection is needed now.

Eroding Rights

Two apparently unrelated stories reported this week may well foreshadow a trend toward limiting the rights of service users.

In the first case, a major manufacturer is now claiming that original material developed through the use of systems engineering is not the sole property of the customer.

In the second instance, service bureau users have been cautioned that they may lose control of their records upon premature termination of contracts.

The user in both cases is being put on the defensive. His servicers seem to be saying that any assistance rendered to him is offered strictly at his own risk.

Perhaps it is time for all concerned to step back and take a long, hard look. The user is contracting for these services. Moreover, he is committing manpower and funds to solving his problems. In return for his commitment, he is entitled to receive the best services that can be provided without having to worry about losing his files or his software, once his requirements have been met.

More Help Available These Days



Letters to the Editor

Left-Justified Data Fields Help Reduce Keystrokes

I am writing in support of the "letter to the editor" titled "Poor System Design Work Seen as Blot on Profession" [CW, June 25]. I am directing my support to the segment of the letter relating to keypunching data fields "left justified" and using the computer to right justify the fields and inserting the necessary high-order zeros, if required.

I am employed in an office that implemented this technique in March, 1969, for keypunching one of the major applications processed. This application represents 60% of the monthly keypunching workload or approximately 162,000 cards. Experience to date has shown that there has been a reduction in keystrokes, when keypunching and keyverifying, of approximately 1.8 million per month using this technique. This figure takes into account the keystroke necessary to depress the Skip key which enables you to skip out of the field just punched and stop (under programmed control) at the next field to be punched.

Keypunch operators using this technique are very pleased with this approach. Further, the adjustments necessary to adapt to this concept of punching are negligible.

The above technique is particularly adaptable to tape- or disk-oriented computers. However, it is more difficult to adapt to card-oriented computers.

Mario P. D'Ambrosio, CDP

Washington, D.C.

96-Column Card Has Less, Not More, Total Capacity

Re your news article "IBM Offers New Small System at \$945 per Month" (8/6/69). In this headlined, page one article, you state in the third paragraph (emphasized with a bold eye-catching dot) that the System/3 "96-column punched card has 20% greater information capacity than the familiar 80-column card" (my emphasis).

This is exactly the kind of lie that a responsible news publication in the computer field should be able to detect and correct before publication. The new 96-column card has in fact much less than half the information capacity of the 80-column

card. The point is that the new card allows only 6 punches per column as opposed to the 12 punches per column in the 80-column card. The number of possible different combinations of 80-column, 12-row coding is much higher than the combinations of 96-column, 6-row coding, thus making the information capacity higher in the 80-column card.

The new card does contain space for a larger number of characters than does the old card, but the number of different possible characters (64) is only one fourth of the entire EBCDIC code (256 characters if one includes lower case, control codes, and currently unused codes).

Notice, please, that I am not ignoring the possibility that a small user may not need more than 64 different characters. But that is not the same as saying that he is getting 20% more capacity in the new cards versus the old.

I strenuously object to your passing off an IBM publicity release as news if such a release carries an obvious attempt at misleading the computer consumer.

Kenneth B. Winiecki

Vice-President, Technical Development

Computer Direct Marketing Division
Information Services Inc.
Babson Park, Mass.

Since IBM clearly stated that this system was for small business users, not for everyone, we don't feel the statement was misleading. But we asked IBM if the MFCU could be set up to punch and read special formats, such as 64 columns of 9-bit words, and were told that IBM would be happy to discuss such specialized needs with users. Ed.

Computerworld welcomes comments from its readers. Preference will be given to letters of 250 words or less. Computerworld reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 60 Austin St., Newton, Mass. 02160.

U.S. Government Reports

Use of Compatible Equipment Can Save Users Money

By Peter L. Briggs
CW Staff Writer

Users may be able to save up to \$250/month per tape drive and \$140/month per disk drive with the use of plug-to-plug compatible equipment, according to a recent report to Congress from the Government Accounting Office (GAO). All prices quoted in the report are based on current federal installations, but should fall within 10% to 15% of commercial prices, according to industry experts.

The study defines plug-to-plug compatible components as being directly interchangeable with another manufacturer's component, and not requiring any soft-

ware or hardware modification for interface purposes.

User Experiences

The report, which contains a detailed examination of the various types of existing plug-to-plug equipment, extracts detailed price comparisons (see charts) from various manufacturers who agreed to supply equipment identical in configuration with that delivered by the original system suppliers. The study group contacted several users, and their experiences with independent sources for peripheral equipment were recorded (see list). Firms covered by the survey felt that there were no serious problems encountered, either in acquiring compatible equipment, or in maintaining the equipment, once installed.

Considerations

The factors listed as being significant when considering the acquisition of independent equipment include:

- Operational capabilities of the equipment.
- Need for hardware or software interface.
- Maintenance responsibility and availability.
- Contract terms.
- Relative costs.
- Magnitude of procurement.

In the opinion of the researchers, all these factors were important considerations, and should be weighed carefully by the potential user. Many of the considerations are less significant when equipment is guaranteed to be plug-to-plug compatible, because relative costs can be clearly established. The major factors in such a situation are quality and availability of maintenance.

Federal Savings

The figures assembled by the report indicated that possible savings for the federal government were on the order of \$100 million for plug-to-plug compatible equipment. A further recommendation appeared regarding consideration of third-party leasing due to the large savings possible, both for system acquisition and for large procurements of peripheral equipment.

Sources Not Identified

Unfortunately, the alternate supply sources were not identified, nor were the original-system suppliers. However, many of the prices quoted for original systems are identical with prices listed in the federal supply schedule for IBM and Honeywell equipment. Some of the prices for alternate sources were identical with prices listed for MAI and Ampex equipment.

Typical User Savings

Based on the figures supplied in the study, a typical installation using four tape drives and two disk drives could obtain rental savings of about \$1,280 per year, and could purchase the same equipment at a saving of about \$113,000, when com-

Savings Achieved Through Plug-To-Plug Compatible Equipment

| Organization | Description of Devices | Annual Rental Savings | Purchase Savings |
|--|--|-----------------------|------------------|
| American Airlines New York, N.Y. | 62 tape drives | \$82,000 | |
| American Cyanamid Co. Wayne, N.J. | 10 tape drives | \$36,000 | |
| MacDonnell Douglas Corp. Long Beach, Calif. | 20 tape drives | \$54,000 | |
| General Electric Co. Valley Forge, Pa. | 12 leased and 17 purchased tape drives | \$27,000 | \$311,000 |
| Johns Manville Service Corp. Findern, N.J. | 6 tape drives (twice the speed) | \$7,500 | |
| Lockheed-California Co. Burbank, Calif. | 32 tape drives | \$129,000 | |
| Long Island Lighting Co. Hicksville, N.Y. | 12 tape drives | | \$200,000 |
| Readers Digest Pleasantville, N.Y. | 5 tape drives 1 disk drive (30% faster) | \$12,000 \$1,000 | |
| Major Corporation | 12 tape drives | | \$240,000 |

The listed firms cooperated with the GAO in compiling the survey. The figures represent a combination of the best estimates of researchers, with figures supplied by the companies. The "major corporation" listed refused to be identified. The savings listed do not include any possible benefits accruing from extra shifts. Independent suppliers normally do not charge for extra shifts, whereas system manufacturers often charge 10% to 40% of prime shift rates for extra shifts.

Comparison of Tape Drive Prices

| MODEL # | Original System Manufacturer | | Alternate Source A | | Alternate Source B | | Alternate Source C | |
|---------|------------------------------|----------|--------------------|----------|--------------------|----------|--------------------|----------|
| | Rental | Purchase | Rental | Purchase | Rental | Purchase | Rental | Purchase |
| 1 | \$700 | \$36,000 | \$----- | \$----- | \$----- | \$----- | \$580 | \$15,900 |
| 2 | 900 | 41,250 | ----- | ----- | ----- | ----- | ----- | 18,400 |
| 3 | 900 | 41,250 | 720 | 17,700 | 700 | 18,500 | 720 | 17,600 |
| 4 | 750 | 37,200 | 637 | 16,000 | 651 | 17,000 | 625 | 16,400 |
| 5 | 950 | 42,450 | 760 | 18,000 | 700 | 18,500 | 760 | 18,100 |
| 6 | 500 | 22,700 | 425 | 16,000 | 450 | 18,200 | 425 | 16,000 |
| 7 | 500 | 22,700 | 425 | 16,000 | 450 | 18,200 | 425 | 16,550 |
| 8 | 810 | 36,760 | 650 | 21,700 | 600 | 21,100 | 648 | 18,100 |
| 9 | 810 | 36,760 | 650 | 21,700 | 600 | 21,100 | 648 | 18,900 |
| 10 | 550 | 25,030 | ----- | ----- | 500 | 20,800 | 468 | 19,600 |
| 11 | 860 | 39,090 | ----- | ----- | 650 | 25,000 | 688 | 24,600 |

The above figures were compiled by the U.S. Government Accounting Office for the purpose of demonstrating the available savings through the use of plug-to-plug compatible tape drives. The prices quoted are those quoted to the federal procurement agencies, not those normally available to the average user, but the prices are comparable. An estimate of the price differential ranges from 10% to 15% higher when retailed commercially.

Comparison of Disk Drive Prices

| | System Manufacturer | Alternate Sources | | |
|----------------|---------------------|-------------------|----------|----------|
| | | A | B | C |
| Purchase Price | \$25,510 | \$20,000 | \$18,100 | \$20,500 |
| Rental/month | \$590 | \$496 | \$450 | \$483 |

These figures are a comparison of prices, both for monthly rental and purchase, of disk equipment. The prices listed for the system manufacturer agree precisely with those listed for the IBM 2311 disk drive in the Federal Supply Schedule. The others are not directly identifiable. The same conditions regarding extra-shift rental apply to these alternate sources as to the tape-drive suppliers. There is no charge for extra-shift usage from the alternative sources, whereas the original manufacturer charges an additional 10% of the normal rate, according to the report.

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IPS has for sale the following 360 equipment for immediate delivery: 360/30 65K and 16K CPU's, complete 360/30 65K system, 2404 and 2402 tapes, 2841 and 2311's. Two 360/30 65K CPU's for Sept., 1969 and Jan., 1970 delivery; 2401-3 90KB tapes for December delivery. We are looking for 360/65 CPU or system, 360/50 CPU, 360/40 131K CPU, and any peripheral units for delivery in next few months. If you own such equipment and are upgrading, please let us know. For details and prices on equipment, please call or write.

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Honolulu Trip Will Follow NRMA 11th EDP Conference

LOS ANGELES — The Eleventh Annual EDP Conference, sponsored by the National Retail Merchants Association, will take place Sept. 7-11 at the Century Plaza Hotel.

Following the conference, the committee has arranged for a trip to Honolulu from Sept. 12-19.

All attendees and their immediate families are eligible to take the trip at the rate of \$299 per person.

This fee includes seven nights at the Hawaiian Village, a flower-lei greeting upon arrival, a special "Aloha" cocktail party, a sight-seeing tour of Honolulu, and all transportation for attendees and their luggage between airport and hotel.

For further information, write the National Retail Merchants Association, 100 W. 31st St., New York, N.Y. 10001.

Afips Establishes Publishing Activity To Inform Field on Joint Conferences

MONTVALE, N.J. — The American Federation of Information Processing Societies (Afips) has established a publishing operation, Afips Press, to serve the computing and information processing field.

According to an announcement by Dr. Richard I. Tanaka, Afips president, "The Afips board of directors has authorized establishment of Afips Press to provide all required coordinating and management functions necessary for publication of proceedings of the semiannual Spring and Fall Joint Computer Conferences, as well as additional Afips proceedings, reports, brochures, and information booklets."

In addition, Tanaka announced that Mrs. Nelle W. Morgan has joined Afips Press as production manager. Mrs. Morgan will be responsible for all general publishing activities, reporting to H.G. Asmus, executive secretary of the federation. Mrs. Morgan was general manager of Thompson Book Co. in Washington, D.C.

Afips Press is planning to make available copies of all Joint Computer Conference proceedings since the inception of conferences in 1951, said Tanaka. Afips Press has acquired existing stocks of volumes 30 through 34, which cover the period of 1967 to the present. Current investigations underway point

towards making proceedings available on either microfilm or microfiche, according to Tanaka.

In addition to serving as a central source for all Afips publications, past and future, Tanaka indicated that the federation will also make its publishing services available to its constituent societies on an as-required basis.

ISA Conference Will Feature Three Speakers

HOUSTON — Three guest speakers who will address "High-light" sessions at the 24th Annual Instrument Society of America (ISA) Conference & Exhibit, Oct. 28, 27, and 30, in Houston's Astrodome will be James H. Binger, Dr. Denton Cooley, and Col. Frank Borman. Binger, chairman of the board and chief executive officer for Honeywell, Inc., will speak Oct. 28 on "The Systems Dilemma and Appraisal of Systems Management as We Go Into the '70s."

Dr. Cooley, clinical professor of surgery at Baylor College of Medicine and chief of cardiovascular surgery at St. Luke's Episcopal-Texas Children's Hospital, will give a talk titled "Cardiac Replacement with an Orthotopic Prostheses and an Allograft" on Oct. 29.

Col. Borman, NASA field director for advanced space stations and the Apollo 8 astronaut who commanded the first manned spacecraft orbit of the moon, will speak on Oct. 30. He will discuss opportunities for space station developments in the '70s, as well as instrumentation aspects of Apollo 8 and the Apollo 11 manned lunar-landing mission.

All three sessions are "open" sessions. Conference registration is unnecessary for attendance.

New Literature

The CC-30 Communications Station brochure describes all peripheral devices, and the CC-36 describes TeleVideo Conversational/Batch Station. Write Computer Communications, Inc., 701 W. Manchester Blvd., Inglewood, Calif. 90301.

A brochure giving the complete photo story of a modern electronic vote counting method called Votronics, has been prepared by Cubic Corp., Votronics Division, 9233 Balboa Ave., San Diego, Calif. 92123.

A four-page brochure describes in photos and diagrams Mobark Instruments Corp.'s new digital incremental magnetic tape recorders. Write Norvel Denney, Sales Manager, Mobark Instruments Corp., 1273 Terra Bella Ave., Mountain View, Calif. 94040.

A pocket-size brochure that describes the data processing services available at Kardon Service Bureau is available by writing the bureau at 219 N. Broad St., Philadelphia, Pa. 19107.

the computer industry's first key-to-disc data input system accepts the output from 60 or more key stations simultaneously

Time-shared input cuts data preparation costs 50%.

Now you can cut your computer input costs in half. This new innovation in data preparation techniques gives you two money-saving advantages over conventional keypunch or one-key-board/one-magnetic-tape-per-operator systems: (1) the LC-720 employs a computer time-shared input; (2) it is the only system available that provides data output directly on IBM/360-compatible magnetic disc.

By time-sharing the data from 60 or more keyboard operators simultaneously, significant savings in data station costs of as much as 50% can be achieved. Costs drop to as low as \$4300 per data station for a typical 60 station system. For large data preparation installations, the time-shared input is the only economical way to go.

Data entered into the LC-720 is processed by a small digital computer and stored on an IBM/

360-compatible magnetic disc that provides the advantages of bulk storage and high speed random access of data. The problems associated with punched card handling or the mounting, pooling, merging and unmounting of magnetic tape reels are eliminated. All data is conveniently and economically stored in an IBM 1316 disc pack for direct high speed input to your modern data processing system. Naturally, an IBM/360-compatible magnetic tape is also provided with the system as standard equipment.

The LC-720 KeyDisc System also offers for the first time, data verification requiring one input pass only through the system, in addition to the normal technique of verification requiring two different operators. Record size is infinitely variable by each operator from 1 to 120 characters long and the system stores a large library of 30 or more different format control programs, all available simultaneously to any and all operators.

LC-720 KeyDisc System

Bring your own data for a demonstration

Logic Corporation invites you to see an operating demonstration of the LC-720 KeyDisc System at the company's premises. Bring your own original data and Logic will provide a reel of magnetic tape of the output of your data from the LC-720 for later printout at your own computer facility.

To arrange for a demonstration, contact Gary Tischler, Director of Marketing (201) 334-3713

LOGIC CORPORATION

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Communications and Data Products Division



COMPUTERWORLD

education

Co-Developer of Basic Will Lecture on T/S

WASHINGTON, D.C. — John Kemeny, Albert Bradley Third Century Professor at Dartmouth College and co-developer of the Basic time-sharing language, will be the featured speaker at the opening session of a lecture series on "Computers, Communications and the Public Interest."

The talk will be Sept. 11 at 4 p.m. in the auditorium of the Johns Hopkins School of Advanced International Studies,

1740 Massachusetts Ave., N.W. Title of the talk will be "Large Time-Sharing Networks."

Discussants at the Kemeny session will be Jack Bertram, general manager of the advanced systems development division of IBM and Alan Perlis, chairman of the computer science department at Carnegie-Mellon University.

Lee DuBridge, science advisor to President Nixon, will preside at the session.

Condensed Computer Encyclopedia — Philip B. Jordain
Publisher — McGraw-Hill Book Co., Inc.

This book, alphabetically arranged and cross-referenced, explains clearly and concisely the bewildering array of terms that tends to impede familiarity with this vital field. The book is designed to meet the needs of the businessman who has to (or wants to) deal with computers, the student who uses a computer, and the junior programmer about to embark on a career. It employs a threefold technique that makes it equally valuable to the computer specialist, however, since it allows the user to pace himself for desired depth of understanding in any entry.

1. Basic entries (such as *computer*) are described in layman's terms, while more complex entries (such as *overlay*) make fuller use of basic computer terminology.

2. Entries are developed from an easy-to-grasp basic definition to more advanced concepts, paragraph by paragraph.

3. The technical explanations, with details of interest to professional programmers only, are set in smaller type than the main body of the entry. The broader concepts are discussed in clear, meaningful language, illuminated with examples from everyday life. For example, Jordain explains *location* as follows:

Any place in which data may be stored. Location is similar to address, a unique identification of the site at

which data are to be placed or retrieved. It is usually expressed as a number. . . . A location, or address, is comparable to a post office box number, provided that the post office box could hold only one letter at a time, and could be emptied repeatedly without depleting it. By using a Zip Code (equivalent to the core bank number or sector address), one particular post office out of all in the country could be designated. The box number within the post office could be designated. The box number within the post office could be used to specify the destination of a letter, or the source from which the letter is to be retrieved.

Snobol3 Primer — An Introduction to the Computer Programming Language

by Allen Forte

Publisher: MIT Press, Cambridge, Mass.

A 107-page paperback, the book is designed to be read by people with no previous experience with computing machines. It is not recommended by the author for experienced programmers. The major features of the language are presented without reference to particular fields of application. Having read the book, one should be able to write at least one computer program that could be executed successfully.

English Course Aids Algerians With Computers

PHILADELPHIA — Thirty-six representatives of Sonatrach, the Algerian government-owned oil company, have completed a five-week intensive course in English at the University of Pennsylvania.

The course prepared them to learn computer technology.

Sonatrach will establish and operate a major computer center in Algeria. Training their personnel in this country will enable Sonatrach to staff the new facility completely with Algerian technologists and to establish self-sufficiency in the computer sciences.

During the course, the Algerian businessmen were guests of Scientific Resources Corp.

State Contract Awarded to SCT

WEST CHESTER, Pa. — The state of New Jersey has awarded a contract to Systems & Computer Technology Corp. (SCT) of West Chester, Pa., to develop and present at four New Jersey state community colleges an orientation course in computer concepts for New Jersey local officials.

The course will provide a practical and basic introduction to automatic data processing for New Jersey's appointed or elected policy-making officials who have little or no computer experience.

The course will be oriented specifically to the needs of New Jersey municipalities.



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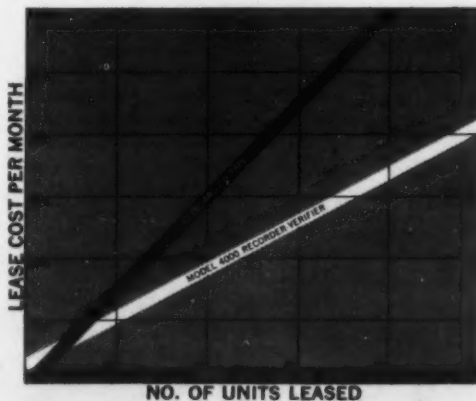
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applications

Computer-Assisted Farms Reduce Enterprise Costs

LITTLE ROCK, Ark. — When an agricultural extension service agent stops to talk to a farmer in this state, chances are he is discussing last month's computer run, instead of the weather.

Farmers are reaping the benefits of an electronic record-keeping service operated by the state Farm Bureau Federation in conjunction with the University of Arkansas extension service.

"The demands of modern agriculture on enlarged and specialized farms surpass the do-it-yourself capability of the unaided farm manager or owner," stated Waldo Frasier, executive vice-president of the farm bureau, "especially when he is engaged full time in working his land."

Daily Records

Each farmer, working from daily activity records kept in a pocket notebook, submits monthly reports on livestock, crops, feed, machinery, labor, and land use.

In addition, all financial transactions are reported to the farm bureau by means of specially designed banking forms.

When a farm subscriber makes a bank deposit or pays a bill by check, a copy of the transaction document is sent to the farm bureau data processing center.

Originally, a problem existed because farmers had to be instructed in the proper methods of supplying data for input.

Accordingly, agents of the agricultural extension service were trained to provide the proper instruction to farmers using the record-keeping system.

"The farmers want to get the most detailed information about their operation," declared J.O. Kumpe, farm management specialist at the extension service, "but we had our agents explain that the computer-evaluated outputs could be only as accurate as the information they were reporting to the farm bureau."

At the farm bureau, the record-keeping service is processed on a System 360/30, which provides complete statements and reports for subscribing farmers.

In addition to monthly partial enterprise reports, farmers receive year-to-date and annual summaries indicating profit or loss products in terms of land use, actual hours, and cost of labor, machinery, and material for each. Based on this type of information, the farmer can determine whether to abandon, diminish, or expand a product area.

Modern Farmer

Harold Ohlendorf, owner of the 5,000-acre Midway Farm in the northeast delta of this state, described what the record-keeping service has done for his operation.

"There is no question that we have reduced our time load," stated Ohlendorf, adding that his office staff had found "very few discrepancies" with the

figures provided by the farm bureau system.

"Most people don't realize that the farmer is caught in a price-cost squeeze," he stated, "and our capital investment per worker is twice that of other industries."

Because of these constraints, Ohlendorf feels that the farmer has to utilize computer-assisted services to optimize his profits. "By using the farm bureau service, we have more time to analyze our enterprise costs," added Ohlendorf.

Programmers Consult Oracle Time-Share System for Cobol and Fortran Testing

NEW YORK — In what is described as the first major application of time-sharing in Cobol and Fortran, programmers at Equitable Life Assurance Society are using an RCA Spectra 70/46 system to write and test programs on-line.

Utilizing a software debugging package known as on-line rapid access computer languages (Oracle), the system "will provide programmers and operations research analysts with an outstanding environment for the development of new computer applications," according to David H. Harris, Equitable vice-president for technical services.

Harris added that plans call for 48 remote communications ter-

minals to be added to the Spectra system.

With Oracle, Equitable's programmers will have access to Cobol, Fortran, and Basic compilers, testing tools, and debugging aids that will enable them to conduct a meaningful hands-on test session from either teletypewriters or RCA video data terminals.

Cobol programs, once debugged, will be transferred to other Equitable computers for recompilation, final test, and subsequent production runs.

Fortran programmers will, in most cases, take advantage of both the conversational and batch Fortran compilers available with the Spectra 70/46 to

develop and run their programs.

Equitable's data processing department presently operates various second- and third-generation systems. In addition to on-line debugging and testing, the Spectra 70/46 can be used for concurrent processing of conventional batch programs when under the control of RCA's time-sharing operating system.

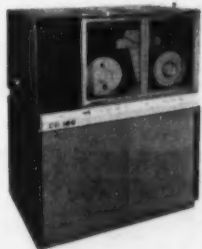
Oracle was developed by Equitable's data processing staff with the cooperation of the firm's systems development department. In addition to debugging and testing, the Equitable time-sharing system can be used for concurrent processing of conventional batch programs.



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*Standard Model 180 Microfilm Printer—price includes camera, tape deck, forms projection, horizontal and vertical tab capability, parity checking and automatic re-read feature (maintenance not included).

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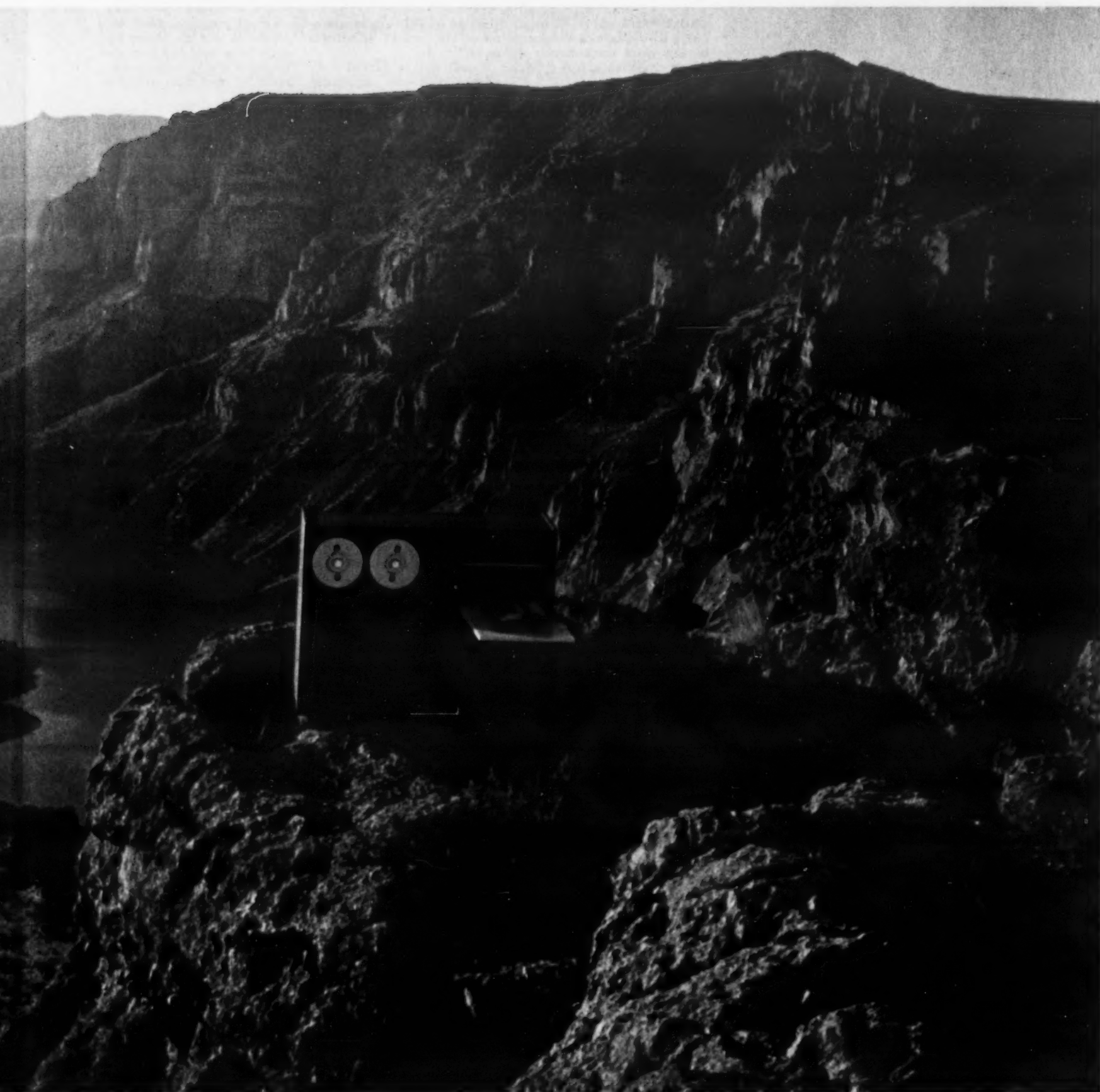
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unique Honeywell features like smooth vacuum tape drives and electronic keyboards second to none.

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using the name Keytape to describe anything that records data onto magnetic tape.

Before things get completely out of hand, we'd like to make one point.

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Communications and Data Products Division



By the time this young foal reaches racing age — two years old — his name may have been selected by computer.

Computer Helping Race Horse Owners To Find Unique Names for New Entries

COLUMBUS, Ohio — Harness racing is turning to a computer to help name the hundreds of thousands of colts foaled each year.

Researchers at the U.S. Trotting Association (USTA) here are storing the names of all modern-era harness horses — both trotters and pacers.

"Having this information available centrally will let breeders and owners quickly determine whether a name has already been used," said Dennis Nolan, USTA DP manager.

"This will save both anguish and much repetition in settling on an appropriate name.

"When the master file of names has been completed later this

year, we also will begin assisting owners in actually selecting a name."

A name may be claimed at the time of application for registering the horse. Most requests are made prior to the animal's reaching racing age, two years old.

Among the factors to be considered in naming a horse are:

- A harness horse may have no more than three words in its name nor can it be longer than 18 units, including two spaces.

- There may be no similar sounding names whose differences are only in the spelling, such as "Night Flight" and "Nite Flite."

- If a name has been used previously, it may not be used again for at least five years after the death of the original horse or about 20 years after registration.

- Names of horses who are world record holders can never be used a second time. In addition, the names of horses whose records or performance distinguished them can be removed from the available category on a permanent basis by owner request. Among the names that are legendary in the harness-racing industry are Dan Patch, Bret Hanover, and Cardigan Bay — the sport's first million-dollar winner.

- Names of famous dams and sires cannot be incorporated into a name unless the horse was a blood-line offspring.

The IBM 360/20 is programmed to review all of these considerations, including a review of similar-sounding names.

When an owner requests a name, he submits three choices. Sometimes none of these is available. The computer takes the three name choices, rearranges them, and determines whether one of the combinations is available if none of the original three can be accepted. If necessary, the computer may introduce names of the sire or dam of the young horse to find an available combination.

"The many regulations on name selection, the hundreds of thousands of previously assigned names, and the names of some 175,000 active standardbred horses have made the use of a system like this imperative," Nolan said.

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Service Tells Radiation Effects

LExINGTON, Mass. — Computer simulation of nuclear and spatial radiation effects on electronic equipment is being offered as a service by Design Automation, Inc. to assist manufacturers in complying with radiation-hardened equipment contracts.

Prediction of radiation effects through computer simulation is felt to be valuable, according to the company, in conjunction with, or as an alternative to, irradiation exposure tests in flash x-ray or neutron beam facilities, to test the "hardness" of a proposed design. If further radiation hardening is desired, the plots and tabulations produced from the simulation can be of enormous help in the redesign, the company claims.

The service is available from the company's offices at 809 Massachusetts Ave., and encompasses all phases of analysis for radiation-sensitive equipment.

1130 Fortran Programs Can Run On 360 Using 'Byte-Fortran' Software Package

RIVERDALE, N.Y. — Byte-Fortran, a new package being offered by David Turetsky Associates provides "the only real solution to converting Fortran programs from the IBM 1130 to the S/360 Models 25 and above," according to Turetsky, company president.

The package claims to create, within the S/360, an operating environment suitable for

1130-designed programs. The package takes full advantage, according to Turetsky, of the highly efficient data manipulative capabilities of 1130 Fortran and still allows operation as if the program were written in standard 360/Fortran.

Additional Features

Some of the features included with Byte-Fortran are: console input, automatic overlaying and linking of program phases, bit-test capabilities for the Upsi switches set at execution time, card stacker selecting, and sensing of the printer control channels.

The 1130 Commercial Subroutine Package is included in the support package, allowing the user to take advantage of these capabilities without the

expense needed in the 1130. The company claims that Byte-Fortran is at least four times more efficient in core usage than standard S/360 Fortran and twice as efficient as 1130 Fortran. "Byte-Fortran will run about four times as fast as 360/Fortran!" Turetsky told CW in discussing the package, and can operate in any Fortran environment on S/360.

Available for an initial payment of \$1,250 plus monthly payments of \$250, the package can be split into two parts, either of which can be leased for half the full price. One piece contains the manipulative and channel/printer controls, the other contains the Fortran I/O package. Byte-Fortran is available from the company's offices at 4455 Douglas Ave., Riverdale, N.Y. 10471.

Bank CIS Package Creates, Uses Data

READING, Pa. — A modular package that supports the creation, updating, and utilization of a central information system (CIS) for banking or financial companies has been announced by Systems Associates, Inc.

The system is comprised of several modules, including the on-line monitor, a maintenance module, a conversion package, a request processor, a report generator, and a reorganization package. The system offers, according to the company, complete management and accessing of a central information pool.

Customer accounts are com-

pletely cross-referenced by name and type of account, providing retrieval of complete information about any customer, including all his accounts, by either name or number. The cross-references are generated automatically during the addition of new accounts or customers, the company claims.

The user can access the system through either a 1050 data communications console or an on-line 2260 terminal. The system maintains files as fixed-length indexed-sequential data sets on the S/360 and requires at least a 65K storage capability.

The on-line system requires a 32K partition for communications, but it will drive several systems in addition to the CIS package, including commercial loan, on-line savings, etc.

There are seven systems currently installed, with contracts for about thirty more before the end of the year, according to Francis McCarthy, company vice-president. The package is available from the company's offices at 356 Penn St., and it sells for \$30,000. The price includes two weeks education and tailoring at the user's site plus full documentation and manuals.

Microfilm Output From Magnetic Tapes Cuts Storage Costs, Saves Tape Dollars

NEW YORK — A new service for the metropolitan area here that will accept magnetic tape directly from computer systems and produce KOM-90 standard Kodak microfilm in under seven minutes has been opened by Installations and Research, a local service company.

Using the KOM-90 unit, which operates at speeds up to 90,000 char/sec, the company claims that it will convert a tape containing 2,200 pages of normal computer printout (normally requiring two hours to print on an S/360 high-speed

printer) and produce about 6 oz of film containing the complete run.

Available from the company's offices here at 110 Hudson St., the service includes vault storage for master copies of all films, if desired.

New ITT Center Offers Complete Processing

ST. LOUIS, Mo. — International Telephone and Telegraph Data Services has opened a new computer center here to provide the company's Reactive Terminal Service to local firms.

The center will offer the complete line of service currently available from the Paramus, N.J., center including remote batch, conversational time-sharing plus consulting and system design.

The center will also offer a local connection for Action, an ITT service for consumer finance operations, and will house the two S/360s used to operate the service. Located here at 7820 Bonhomme Ave., the center is intended to provide service for the twelve-state region including Arkansas, Iowa, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Nebraska, N. Dakota, S. Dakota, Tennessee, and southern Illinois, according to the company.

New York Gets Univac 1108 Time-Sharing Unit

NEW YORK — A new time-sharing service has entered the service field here, this one using

the Univac 1108 with the company's new Exec VIII operating system.

The new service, based here at 320 Park Avenue, is run by Access Systems and consists of a DCT 2000 terminal connected to the central facility at Paramus, N.J. Users can connect to the service through any standard conversational terminal and have the use of the DCT 2000 for high-speed data or file transmission, according to the company.

Tax Preparation Service

NEW YORK — First National City Bank is offering a new service to its personal banking customers during the next tax period. The new service will provide, through the use of terminals developed by Tax Corp. of America, preparation and calculations for city, state, and federal returns.

The customer will supply the raw data for deductions and income, and TCA will send the prepared tax return to the customer for signature. Basic costs for the service will run \$5 for federal forms 1040 and 1040A and \$3 each for the New York state and city returns. Stressing that the bank is not offering tax counseling or advice, James D. Farley, bank vice-president, said that persons who have a completed form should consult with their tax attorneys or accountants for detailed advice on changes to the standard forms of deductions, etc.

English Company Improves 'Snap' Network Package

STAFFORDSHIRE, England — A new version of the System of Network Analysis (Snap) has been made available by International Computing Services Ltd. in a recent announcement. Known as Snap II, the new group of programs is said to offer major improvements in the scheduling and planning of large-scale systems and operations.

Originally designed for the Electricity Generating Board here, the improvements are oriented to the establishment of several simultaneous operations,

such as power stations, where time factors and planning stages are critical, the company said.

Better communications between clients and suppliers during the contractual establishment phases, continuing performance assessments, financial and budgetary control, and forecasting of future costs and expenditure plans are among the benefits claimed for the new package.

Designed to operate on ICL computers, the package is being offered through the company's headquarters here at Kidsgrove, Stoke-on-Trent, Staffordshire.

Real Estate Development Package Analyzes Construction Variables

LOS ANGELES — A package that is aimed at the real-estate development market and uses probability analysis techniques developed at the Harvard Business School has been released through Software Services, Inc., a local firm.

The program, according to the company, has been used successfully by over 40 firms engaged in the development of real estate and is now being marketed through the company at its offices here at 1901 Avenue of the Stars.

The user enters all the relevant

variables for such development projects, including construction costs, financing charges, market potential, operating expenses, and sale or refinancing factors.

Allowances for certain conditions of probability and uncertainty are made in the input, and the output explains the probabilities and ranges of cash requirements and expected return on investment, after discounting.

The package sells for \$5,000 and service prices range from \$300 to \$500 per analysis, depending on the application.

Package Predicts Product Profits

PASADENA, Calif. — A new simulator package for budget alternative analysis, called Pacer, (planning and controlling expected revenues) has been announced by Economatics, a local software firm.

Aimed at manufacturing industries, the package analyzes the profitability of each product line, facility, and department within a company and prepares detailed cost analysis and budget projections, based on various possible spending plans.

Written in Fortran IV and available from the company's offices here at 225 S. Los Robles, Pacer is fully documented and available immediately, according to the company.

Center Has Off-Site Flexibility

ENCINO, Calif. — A new service providing off-site machine time gives greater flexibility to users seeking computer time in the Los Angeles and Orange County area.

Marshall Data Center, which is providing the expanded facilities, says that users will benefit by faster service and increased back-up potential in case of ma-

Systems with machine time available at the various sites include IBM 360/20, 25, 30, 40, 50, and 65, as well as Honeywell, CDC, Univac, Burroughs, and NCR equipment.

The new capability is being offered in addition to the usual service bureau operations available at the Marshall Data Center on its 360/30.

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PAGE 23 FOR DETAILS.

Bunker-Ramo Unifies 4 Branches Into Information Systems Group

OAK BROOK, Ill. — The Bunker-Ramo Corp. has consolidated four of its corporate operations into a new organization called the Information Systems Group.

The new group consolidates in-house capabilities for automated data services, management information, and automation and control of machines under one organization.

The operations involved in the move are: business and industry division, numerical control systems division, numerical control retrofit division, and Data Technology Inc., a subsidiary.

The new group will head-

quarter in Stamford, Conn., under the direction of group vice-president, Dean W. Freed, formerly vice-president and general manager of the numerical control systems and numerical control retrofit divisions.

"It is our intention," said Dr. Milton E. Mohr, president of Bunker-Ramo, "to place increased management attention and emphasis on the opportunities for growth in all areas of on-line, computer-based accumulation, processing, storage, retrieval, and efficient presentation of data for immediate human use and on the problem of effective transmission of

human commands into mechanical operations of machines on a real-time basis.

Discussing his new group, Freed capsulized the capabilities of the four-component structure of the new ISG as:

- **Business and Industry Division, Stamford, Conn.:** Operates a nationwide stock market information network; has supplied large-scale, computer-based systems to major airlines and bank institutions; and produces CRT input/output terminals for on-line data processing systems used in many different industries.

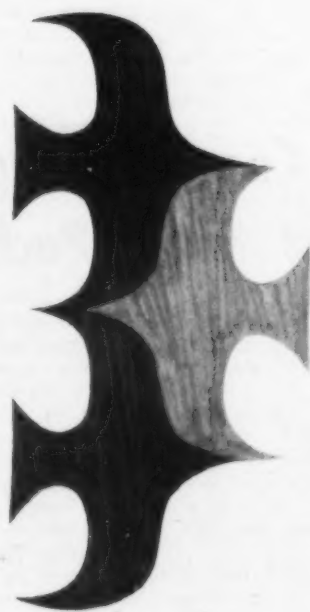
- **The division is building a new 350,000 sq-ft plant in Trumbull, Conn.,** which will include a computer communication center employing two large-scale, real-time processors and other advanced data processing equipment to service over 25,000 input/output devices scattered throughout the U.S. and Canada.

- **Numerical Control Systems Division, Highland Heights, Ohio:** Develops and manufactures continuous path and positioning numerical control systems, read-out systems, and electric drive and feedback systems for more efficient operation of machine tools.

- **Numerical Control Retrofit, Highland Heights, Ohio:** A special service to assist users of machine tools in converting existing production machinery to N/C operation on a custom basis.

- **Data Technology Incorporated, Watertown, Mass.:** Manufactures rotary encoders, integrated-circuit counters, and digitizer systems for digital indication of position and for the translation of graphic data into numerical format for use in computers or to prepare N/C tapes. "These divisions are extremely complementary," stated Freed, "and as such, form an ideal base for interdivisional support, intradivisional growth, and assurance that we can take full advantage of the market opportunities."

Freed, 46, spent his entire professional life in the development and production of electronic systems. Prior to joining Bunker-Ramo at its formation in 1964, he held executive engineering and administrative positions at Sylvania, Clevite, and TRW. He was vice-president and general manager of the Bunker-Ramo N/C divisions.



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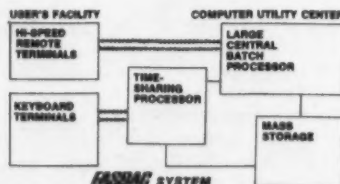
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The special FASBAC system developed by University Computing Company interfaces low-speed data terminals in user offices with large computer systems in Computer Utility Centers. These low speed terminals provide an effective means of controlling and monitoring large volumes of data transmitted to these large computers over high speed data terminals also located in or near user facilities.

In addition FASBAC users have access to very large, low-cost bulk storage devices linked to the powerful computing systems at the UCC Computer Utility Centers. Files maintained in this storage can be shifted on command by remote users into the central computer for processing, or they can be used as the basis for a centralized remote query service. An important aspect of FASBAC is the hierarchy of processors used to perform various grades of processing assignments thereby in-

suring the most economic handling of a user's computing needs. Finally, the necessary tie up with FASBAC systems and the UCC Computer Utility Centers can be achieved with virtually any or all of the low speed and high speed data terminals now in common use. Your becoming a FASBAC user can be as simple as placing a phone call.

FASBAC is an extraordinary achievement. It moves the age of mass computer usage a tremendous stride forward, by putting within the reach of the professional worker in remote locations the computing power he needs and can effectively use for the job at hand. With FASBAC, UCC can now offer an unmatched service, price-wise or performance-wise, to those who have need of effective on-site large scale computing power. For further information, simply write FASBAC, University Computing Company, P. O. Box 6171, Dallas, Texas 75222 or call (214) 741-5781.



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August 20, 1969

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Amex stock watch personnel spot unusual trading pattern in the two-foot-high Transactions Journal.

Detailed Trading History Spewed Daily by Amex

NEW YORK — Hours before the opening bell signals the start of trading each day on the American Stock Exchange, computers have already produced a two-foot high stack of reports that completely reconstruct the previous day's activity in each of the 1,300 Amex-traded security issues.

If unusual activity in a security has come to light, for example, an official in the Exchange's membership compliance division may examine a Journal report to determine the stock's precise trading pattern on the day, or days, in question.

Concentrations of trading by a member brokerage firm — valuable in tracing sources of volume — can be pinpointed by comparing times of transactions indicated on the Journal reports, with times orders were transmitted to the exchange trading floor.

The Journal also is useful in evaluating stock specialists' effectiveness in maintaining fair and orderly markets.

The Journal, consisting of separate reports detailing the previous day's activity in each individual security, is delivered to the offices of Exchange Compliance officials before they arrive at work in the morning.

The report for each issue lists, in sequence, every transaction together with the exact time of execution, number of shares involved, price, quotation at time of execution, and plus or minus variation from previous sale.

Figures indicating specialists' participation later are added to this trade-by-trade account.

Prior to November, 1967, when the Journal was initiated, trading had to be reconstructed by laboriously copying sales tickets.

The Journal now is produced by the Exchange's computer complex, which conducts an automated clearance of both Amex transactions and trades of

the National OTC Clearing Corp.

Computers produce other market-watching aids useful to the Exchange in fulfilling its self-regulatory function.

An hourly printout spotlights abnormal price and volume movements throughout the trading day, for immediate action by stock watch personnel.

Weekly and monthly computer reports detail member firms' percentage of activity in each security, for Exchange scrutiny and members' self-surveillance.

Travelers Starts Talks For Randolph Acquisition

HARTFORD, Conn. — The Travelers Corp., a large insurance and diversified financial company, is negotiating to acquire the Randolph Computer Corp.

Travelers President Roger C. Wilkins said, "We have tentatively agreed upon an exchange of 1.25 shares of Travelers common stock for each share of Randolph common; based on the present number of shares of Randolph outstanding, the transaction will require approximately 3,093,000 shares of Travelers common stock with a total value in excess of \$80 million."

Burroughs Sets 279th Dividend

DETROIT — The board of directors of Burroughs Corp. has declared a quarterly dividend of 15 cents a share on the common stock of the corporation, payable Oct. 20, 1969, to stockholders of record at the close of business Sept. 16, 1969.

This 279th dividend continues a record of regular cash dividends uninterrupted for 74 years.

Wyly Attributes 'The Positive Attitude' to Continued Growth

By a CW Staff Writer

DALLAS — University Computing Co. reported total revenues and net income for the first half of 1969 were about double the comparable period last year. UCC President Charles Wyly, Jr. cited the "shortage of borrowable money and the highest interest rates in our lifetime" as the cause of "a negative attitude in some parts of the general business environment" but not in the computing field.

He attributed UCC's continued growth in revenues and earnings to "the positive attitude in the computer industry, since the use of computers tends to accelerate in times of general business hesitation, when more productivity and accomplishment by knowledge workers become essential."

Wyly said that the leasing part of UCC's business is "the area where the impact on profits is most emphatic, and where more of the net revenue goes to the bankers than to the owners of the business."

"However, the outlook for profit growth in the product and service segments of UCC is good."

Wyly expects 1969 earnings to be about \$15 million, or \$2.50 per share.

UCC has also applied for listing on the New York Stock Exchange and expects trading to commence in September.

Wyly commented that the recently announced "unbundling" of prices by IBM is a stimulant

to the industry and "greatly enlarges the market for UCC services in the 1970's."

"We believe that this placing of separate values by IBM on a range of capabilities affirms that this is a multi-function industry, and UCC is particularly well constructed to compete in most sectors of the business," he said.

Financial Breakdown

UCC profits rose from \$2.7- to \$6.6-million.

Net income from computer operations amounted to \$3.2 million, after elimination of inter-company transactions and minority interests in publicly owned subsidiaries.

In addition, UCC's equity in the earnings of its subsidiary,

UCC Financial Corp., amounted to \$3.4 million. Total net income of \$6.6 million was equal to \$1.11 per share, based on 5,886,000 average shares outstanding. Revenues for the six month period were \$49 million.

For comparison, net income for the first half of 1968, restated to include acquisitions made on a "pooling of interest" basis, amounted to \$2.7 million on restated revenues of \$26.9 million or 44 cents per share based on 5,268,000 average shares outstanding. Average shares include common shares and common equivalent shares for the comparative periods, computed in accordance with the new recommendation of the accounting principles board of the AICPA.

SEC Considers Regulation Of EDP Trading Systems

By A.B. Williams

CW Staff Writer

NEW YORK — The Securities and Exchange Commission is considering plans to regulate automated stock trading systems which do not already fall under SEC surveillance.

The SEC's major concern appears to be that there is a genuine possibility of manipulation, or of the transmission of fictitious or misleading information.

The SEC, however, acknowledges that "automated systems may also have a potential in the opposite direction, for improved monitoring and recording of trading information."

Two such systems, previously discussed [CW Ap 2, '69], are named Instinet and Autex.

Of the two, Instinet is the more revolutionary, in that all trades would be fully negotiated within the computer, by parties unknown to each other, with no broker (or brokerage fee) involved.

Autex is simpler. Under this system, interested brokers would be made known to each other following identification of negotiable interests and then could conduct business.

A high official of Autex Service Corp. commented on the subject of manipulation and misleading, "We feel that our system neither adds nor subtracts from such possibilities."

"The broker's statement is being carried. We feel no more responsible for the content of such statements than would the telephone company feel responsible for a telephone call."

He added that the Autex block trading service has been in full operation since Aug. 1, handling some 10,000 messages per day through about 300 brokers for 40 institutional customers.

Herbert L. Behrens, president of Instinet, said that his company has always paid particular interest to this whole area, and

feels that it has accomplished what it set out to do.

Instinet is not yet on the air, but its system has demonstrated certain features that appear to answer specific objections, in that it deals in hot (real-time) copy, is timed, dated, stored, and retrievable, and offers the opportunity for effective monitoring.

While the SEC has not decided on the specific forms of regulation, areas of present concern include:

- That such systems file descriptions "detailing specific rules of operation designed to prevent abuse of the system."

- That rules include methods "designed to prevent fictitious or misleading information from being transmitted."

- That precautions include a plan "to prevent manipulative, deceptive, and fraudulent use of the system."

- That there be "precautions protecting the security of the system and information therein from unauthorized access and technical malfunction."

- That there be "provisions for preserving and retrieving records of information resident in the system, including timed and identified entries into the system, and provisions for adequate commission access to such information."

Mohawk, IBM To Cross License

NEW YORK — Mohawk Data Sciences Corp. and IBM have entered into a patent cross-license agreement, according to V.E. Johnson, chairman and chief executive officer of Mohawk Data.

Johnson said that "the parties had agreed not to disclose the specific terms of the agreement."

Computers as Stock Swappers

Market Needs Automated Trading

By A.B. Williams
CW Staff Writer

Automated stock-trading systems have been in the news lately (see story on page 19). They feature computer involvement to a greater or lesser degree, depending on whether a trade is actually negotiated and closed through the medium of the computer, as in the Instinet system.

Such systems appear to represent progress. To be sure, Instinet threatens to eliminate a number of healthy large-block brokerage fees and to perform the brokerage service at lower prices, increasingly lower as the

size and volume of trading builds up within the system.

Instinet was announced at the height of the screaming about the back-office mess; it appears to have more potential for a favorable impact on the problem in that it removes brokers from the paperwork, the physical preparation and delivery of transfer documentation.

This appears to be the real bottleneck, which has not yet been solved.

The release from the Securities and Exchange Commission, dated Aug. 4, is based on the premise that if automated stock-trading systems are to be

allowed, then they should be regulated, perhaps as exchanges (Instinet's computer will be acting in much the same capacity as the trading floor of an exchange) or as broker-dealers (the difference being that a broker trades securities for others, while a dealer takes capital risk for a capital reward).

Getting Late?

One interesting sidelight is that the SEC's release, which posed the inherent problems and asked for comment, was dated three days after the Autex system went into commercial operation.

So the commission might be viewed as being a bit late, both by those opposed to these systems and by those who would like to see such systems in general use.

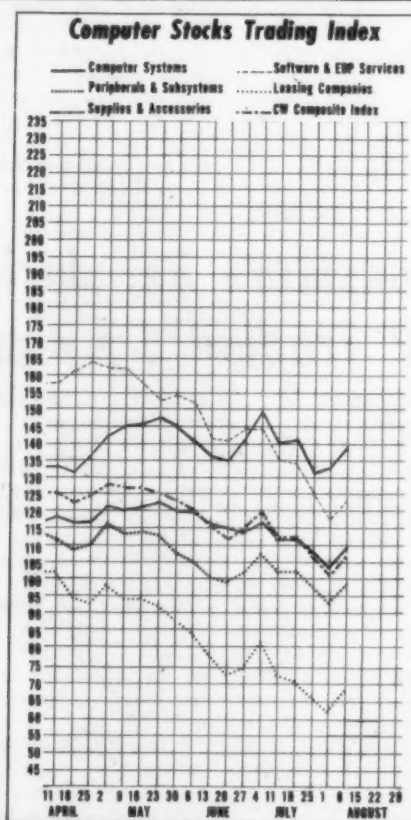
The SEC makes good points. To whatever degree misleading information or fraudulent trades can be passed through a system, a counteracting degree of precautions must be taken.

An automated system must be able to regurgitate information on past trades, particularly in the Instinet system of computerized trading. This is part of the monitoring function that the commission will insist on.

This may even be the crucial problem. Automated trading cannot be observed, as is the case with exchange activities, which take place via the agency of floor specialists.

So the whole ball of wax depends on system design and proper coding, which must be able to prevent collusion by the assigning of a fraudulently high price to the first seller or buyer in line, rather than to two parties who hope for unrealistic benefits.

The SEC should, and must, be thoroughly satisfied with the human contributions that will make the system run.



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COMPUTER STOCKS: TRADING SUMMARY

LISTED CLOSE 8/7/69 OTC CLOSE 8/8/69

| COMPUTER SYSTEMS | | | | | WEEK | | WEEK | | |
|------------------|---------|---------|-------|--------------------|------|--------|-------|--------|--|
| EXCH | RANGE | CLOSING | PRICE | | NET | CHANGE | % | CHANGE | |
| N | 141-120 | 138 | 3/8 | RIVERFOUR CORP | + | 1 3/8 | 1.00 | | |
| N | 69- 40 | 41 | 3/8 | COLLINS RADIO | - | 3 3/8 | -7.54 | | |
| N | 159-125 | 149 | 1/2 | CONTROL DATA CORP | + | 1 1/2 | 1.01 | | |
| A | 72- 54 | 64 | 3/4 | DIGITAL EQUIPMENT | + | 1 | 1.57 | | |
| N | 25- 13 | 15 | 1/4 | ELFECTRONIC ASSOC. | - | 3/8 | -2.40 | | |
| N | 98- 83 | 84 | 3/4 | GENERAL ELECTRIC | - | 1 3/8 | -1.88 | | |
| N | 95- 75 | 91 | 5/8 | HEWLETT-PACKARD CO | + | 1 5/8 | 1.81 | | |
| N | 140-107 | 133 | | HONEYWELL INC | + | 8 | 6.40 | | |
| N | 354-291 | 333 | 3/4 | IBM | + | 4 1/4 | 1.29 | | |
| N | 139-108 | 132 | 1/2 | NCR | + | 3/4 | .57 | | |
| N | 48- 35 | 37 | 3/8 | RCA | - | 3/4 | -1.97 | | |
| N | 50- 30 | 35 | | RAYTHEON CO | + | 1 | 2.94 | | |
| O | 43- 24 | 29 | | SCI. CONTROL CORP. | + | 3 | 11.54 | | |
| N | 55- 38 | 42 | 7/8 | SPERRY RAND | - | 7/8 | -2.00 | | |
| A | 36- 26 | 34 | 3/4 | SYSTEMS ENG. LABS | + | 7/8 | 2.58 | | |

| PERIPHERALS & SUBSYSTEMS | | | | | WEEK | | WEEK | | |
|--------------------------|---------|---------|-------|---------------------|------|--------|-------|--------|--|
| EXCH | RANGE | CLOSING | PRICE | | NET | CHANGE | % | CHANGE | |
| N | 82- 59 | 64 | 3/8 | ADDRESSOGRAPH-MULT | + | 2 3/8 | 3.83 | | |
| O | 71- 19 | 20 | 1/4 | ALPHANUMERIC | --- | --- | --- | | |
| N | 44- 32 | 38 | 1/2 | AMPEX CORP | - | 1 1/2 | -3.75 | | |
| O | 19- 9 | 11 | 1/2 | BOLT, BERANEK & NEW | + | 1 3/4 | 17.95 | | |
| N | 17- 9 | 11 | | BUNKER-RAMO | - | 1/4 | -2.22 | | |
| A | 37- 18 | 21 | 3/4 | CALCOMP | + | 1 7/8 | .58 | | |
| O | 38- 18 | 18 | 1/2 | CDROMITRONICS | --- | --- | --- | | |
| A | 16- 9 | 9 | 5/8 | COMPUTER EQUIPMEN | + | 1 | -9.41 | | |
| A | 27- 12 | 13 | 3/8 | DATA PRODUCTS CORP | + | 3/8 | 2.88 | | |
| O | 22- 13 | 17 | 1/4 | DIGITRON | + | 3/4 | 4.55 | | |
| N | 62- 43 | 51 | 5/8 | ELECTRON MEMORIES | + | 4 | 8.40 | | |
| O | 12- 8 | 9 | | FABRI-TEK | + | 3/8 | 4.35 | | |
| O | 37- 20 | 21 | | FARRINGTON MFG | + | 3/4 | -3.45 | | |
| O | 21- 10 | 10 | 1/2 | INFORMATION DIS | - | 1/2 | -4.55 | | |
| A | 34- 17 | 22 | 1/2 | MILGO ELECTRONICS | - | 1/2 | -2.17 | | |
| A | 87- 59 | 83 | 1/2 | MOHAWK DATA SCI. | + | 1 7/8 | 2.30 | | |
| O | 118- 54 | 65 | | OPTICAL SCANNING | --- | --- | --- | | |
| O | 31- 18 | 19 | 3/4 | PHOTON | + | 3/4 | 3.95 | | |
| A | 35- 23 | 29 | | POTTER INSTRUMENT | + | 1 1/4 | 4.50 | | |
| O | 76- 54 | 57 | | RECOGNITION EQUIP | + | 3 | 5.56 | | |
| N | 61- 22 | 26 | 3/8 | SANDERS ASSOCIATES | - | 1 | -3.65 | | |
| O | 85- 37 | 37 | | SCAN DATA | --- | --- | --- | | |
| O | 36- 16 | 16 | 1/2 | TALLY CORP. | --- | --- | --- | | |
| N | 100- 85 | 96 | 1/2 | XEROX CORP | + | 2 3/8 | 2.52 | | |

| SUPPLIES & ACCESSORIES | | | | | WEEK | | WEEK | | |
|------------------------|---------|---------|-------|--------------------|------|--------|-------|--------|--|
| EXCH | RANGE | CLOSING | PRICE | | NET | CHANGE | % | CHANGE | |
| O | 47- 31 | 34 | 1/2 | ACME VISIBLE | + | 3 1/2 | 11.29 | | |
| N | 22- 11 | 14 | 1/8 | ADAMS-MILLIS CORP | - | 1/8 | -.88 | | |
| O | 27- 23 | 24 | | BALTIMORE BUS FORM | --- | --- | --- | | |
| A | 29- 17 | 19 | 1/4 | BARRY WRIGHT | - | 3/4 | -3.75 | | |
| O | 44- 28 | 28 | 3/4 | DATA DOCUMENTS | - | 3/4 | -2.54 | | |
| N | 42- 28 | 30 | 3/8 | ENNIS BUS. FORMS | + | 3/8 | 1.25 | | |
| N | 89- 65 | 83 | 3/8 | MEMOREX | + | 1 1/2 | 1.83 | | |
| N | 112- 94 | 104 | 7/8 | 3M COMPANY | + | 1 3/4 | 1.70 | | |
| O | 37- 29 | 31 | 7/8 | MOORE BUS FORMS | + | 5/8 | 2.00 | | |
| N | 46- 36 | 40 | | NASHUA CORP. | + | 1/8 | .31 | | |
| O | 48- 30 | 35 | | REYNOLDS & REYNOLD | + | 4 | 18.90 | | |
| O | 31- 23 | 25 | 1/4 | STANDARD REGISTER | --- | --- | --- | | |
| N | 36- 28 | 29 | 1/2 | UARCO | - | 3/8 | -1.26 | | |
| A | 20- 10 | 11 | 3/4 | WARASH MAGNETICS | --- | --- | --- | | |
| O | 34- 28 | 30 | 1/2 | WALLACE BUS FORMS | + | 2 1/2 | 8.93 | | |

| SOFTWARE & EDP SERVICES | | | | | WEEK | | WEEK | | |
|-------------------------|---------|---------|-------|--------------------|------|--------|--------|--------|--|
| EXCH | RANGE | CLOSING | PRICE | | NET | CHANGE | % | CHANGE | |
| O | 14- 6 | 6 | 1/4 | ADVANCED COMP TECH | --- | --- | --- | | |
| A | 19- 6 | 30 | | APPLIED DATA RES | --- | --- | --- | | |
| O | 19- 6 | 7 | | ARIES | + | 1/2 | 7.69 | | |
| A | 83- 63 | 77 | 1/8 | AUTOMATIC DATA PRC | + | 1 1/2 | 1.98 | | |
| O | 13- 7 | 7 | 1/4 | AUTO SCIENCES | --- | --- | --- | | |
| O | 17- 8 | 9 | 1/2 | BRANDON APPL SYS | + | 1 1/2 | 18.75 | | |
| A | 21- 9 | 13 | | COMPUTER APPL | + | 2 | 18.18 | | |
| O | 16- 6 | 7 | 1/2 | COMPUTER ENVIRON | + | 1 | 15.38 | | |
| O | 47- 24 | 24 | | COMPUTER NETWORK | --- | --- | --- | | |
| N | 30- 22 | 23 | 1/4 | COMPUTER SCIENCES | - | 1 1/2 | -6.06 | | |
| O | 40- 14 | 14 | 1/2 | COMPUTER USAGE | - | 1/2 | -3.33 | | |
| A | 56- 37 | 47 | 1/8 | COMPUTING & SOFT | + | 1 1/2 | 3.29 | | |
| O | 24- 7 | 8 | 1/2 | DATAMATION SERVICE | + | 1 1/4 | 17.24 | | |
| O | 17- 7 | 8 | | DATATAB | + | 1/2 | 6.67 | | |
| O | 15- 6 | 6 | 1/4 | DIGITEK | + | 1/4 | 4.17 | | |
| A | 38- 12 | 13 | 1/2 | ELECT COMP PROG | + | 1/4 | 1.89 | | |
| O | 30- 20 | 23 | | INFORMATICS | + | 3/4 | 3.37 | | |
| O | 19- 3 | 4 | | MATRIX CORP. | + | 1/2 | 14.29 | | |
| O | 22- 6 | 6 | 1/2 | NAT COMP ANALYSTS | - | 1/2 | -7.14 | | |
| A | 34- 23 | 34 | 3/8 | PLANNING RESEARCH | + | 3 3/8 | 10.89 | | |
| O | 11- 6 | 6 | | PROGRAMMING & SYS | --- | --- | --- | | |
| O | 10- 6 | 7 | | SOFTWARE SYSTEMS | - | 1 1/4 | -15.15 | | |
| O | 37- 5 | 6 | | STRATEGIC SYS | + | 1 | 20.00 | | |
| O | 36- 11 | 19 | | TBS COMP CENT INC. | + | 2 | 11.76 | | |
| O | 12- 5 | 5 | 1/4 | UNITED DATA CENTER | + | 1/4 | 5.00 | | |
| O | 155- 56 | 60 | 1/2 | UNIVERSITY COMP | + | 4 1/2 | 8.04 | | |
| O | 38- 22 | 24 | 1/2 | URS SYSTEMS | + | 1 | 4.26 | | |
| O | 16- 8 | 8 | | U.S. TIME-SHARING | --- | --- | --- | | |

| LEASING COMPANIES | | | | | WEEK | | WEEK | | |
|-------------------|--------|---------|-------|--------------------|------|--------|--------|--------|--|
| EXCH | RANGE | CLOSING | PRICE | | NET | CHANGE | % | CHANGE | |
| O | 45- 25 | 25 | | BOOTH COMPUTER | - | 1/2 | -1.96 | | |
| O | 10- 6 | 6 | | COMPUTER EXCHANGE | --- | --- | --- | | |
| A | 34- 10 | 11 | 1/4 | COMPUTER LEASING | - | 1 1/8 | -9.09 | | |
| O | 14- 8 | 10 | | CONT COMPUTER | - | 1 3/8 | -12.09 | | |
| O | 12- 7 | 9 | 1/8 | CYBER-TRONICS | + | 1 7/8 | 25.86 | | |
| A | 60- 23 | 27 | 1/4 | DATA PROC. F & B | + | 3/4 | -2.68 | | |
| O | 16- 6 | 6 | 1/2 | DATRONIC RENTAL | - | 1/4 | -3.70 | | |
| A | 52- 35 | 36 | 3/4 | DEARBORN COMPUTER | - | 4 1/2 | -10.91 | | |
| A | 16- 9 | 9 | 7/8 | DPA, INC. | --- | --- | --- | | |
| A | 45- 16 | 19 | 1/4 | GRANITE MET | - | 5/8 | -3.14 | | |
| A | 28- 12 | 14 | 3/8 | GREYHOUND COMPUTER | - | 1/2 | -3.38 | | |
| N | 54- 23 | 27 | 5/8 | LEASCO DATA PROC. | - | 5/8 | -2.21 | | |
| O | 9- 4 | 4 | 3/4 | LECTRO COMP LEAS | - | 1/4 | -5.00 | | |
| A | 57- 24 | 28 | | LEVIN-TOWNSEND CMP | - | 1/4 | -.88 | | |
| O | 8- 3 | 3 | 1/2 | LHC DATA, INC. | - | 1/4 | -6.67 | | |
| O | 14- 4 | 5 | | MANAGEMENT ASSIST | + | 1/8 | 2.56 | | |
| A | 39- 18 | 22 | | NATIONAL EQUIPMENT | + | 1 | 4.76 | | |
| O | 12- 6 | 6 | 1/2 | NCC LEASING | + | 1/4 | 4.00 | | |
| A | 43- 18 | 26 | 1/2 | RANDOLPH COMPUTER | - | 1 | -3.64 | | |
| O | 34- 8 | 9 | 1/2 | SYSTEM CAPITAL | + | 1 1/4 | 15.15 | | |
| A | 28- 13 | 15 | 3/4 | U.S. LEASING | - | 1 | -5.97 | | |

Contracts

Ampex Corp. of Redwood City, Calif., has received a contract for \$4.1 million by the U.S. Government to design, build, and deliver an on-line, random-access, bulk computer memory system with a storage capacity of 2 trillion bits of information.

The new system, called the terabit memory (TBM) system, adapts videotape recording techniques to computer technology. It can store up to 50-million bits of coded information on each of 36 10-1/2-in. reels of standard video tape.

The system is designed to put tape libraries on-line with substantial savings in operating cost.

Potential applications include central files of time-shared data systems, programs for large scientific computer centers, and data contained in statistical files, such as those kept by government agencies and some large businesses.

Astrodata, Inc. of Anaheim, Calif., has received a contract in excess of \$1 million from RCA Global Communications, New York. The contract is for switching equipment to be added to the Astrodata computer-controlled switching exchange installed at RCA Global. The expansion will virtually double the traffic capacity of the existing equipment.

Dialscan Systems, Inc., New York, has been awarded a five-year, \$500,000 contract from J.L. Hudson Co. for the installation of the Dialscan charge-sale authorization system. The system permits a sales clerk to obtain credit information within 20 seconds, including dialing a customer's credit card number into the Dialscan computer. J.L. Hudson is a Detroit-based department store chain.

International Computing Services Ltd. will soon begin operating a sales analysis and sales ledger service for Dibbens Builders Merchants Ltd., a subsidiary company to United Builders Merchants Ltd. of England. This is a sales follow-on from the sales-analysis service designed and operated by ICSL for UBM and its subsidiaries.

Computer Sciences Corp. of Los Angeles will provide health insurance executives with the knowledge required to make effective use of their computers under a contract awarded them by the Blue Cross Association and the National Association of Blue Shield Plans. Under the \$125,000 contract, Computer Sciences Institute, CSC's education and training service, will develop two courses for executives and operating managers to be conducted over a two-year period by CSI personnel.

Computer Applications Inc. of New York has entered into a facilities-management contract for the Nasa/Ames Research Center, near Mountain View, Calif. The \$211,955 contract calls for CAI to provide complete computer operations and related support services for the Ames center on an off-shift basis.

Electronic Laboratories, Inc. of Houston has received a \$2,535,779 contract from the Federal Aviation Administration to manufacture 21 maintenance monitors for the computerized air traffic control system now being installed by the FAA.

The American Automobile Association has reached an agreement in principle with International Reservations Corp., subsidiary of Planning Research Corp., for an automated reservation system. The service will link, by computer, a reservation network of hotels, motels, car rental agencies, and airlines with the 12 million members of AAA through its local clubs.

U.S. Army Awards \$10.1 Million Contract For 42 GE ADP Systems Installations

WASHINGTON, D.C. — An award of a \$10.1-million contract by the U.S. Army Corps of Engineers has been made for the installation of GE information systems at 42 sites in 37 cities throughout the U.S.

The order represents one of the largest ever received by GE in terms of installed sites and dollar amount.

Funds for this contract are being supplied by the Corps of Engineers.

Fred Molthen, manager of army programs for GE's federal systems operation, said the contract provides for placement of a pilot system in New York City for the Corps' North Atlantic and New England divisions within the next six months.

Additional installations in seven other regions will be made after the government's acceptance of the pilot system.

The award reflects the goals of the governmental agency to consolidate, standardize, centralize, and update their existing ADP capability.

Corps of Engineers officials have indicated their intention to establish on-line communications between each of the nine centers, creating a nationwide ADP network.

A combination of business and civil engineering programs will be performed by the GE systems.

Each of the Corps' divisions within this network would be

served by a GE-425 and Data-net-30 at the central site and by a GE-225 at the remote sites, which number from two to six for each division.

The central site configuration will feature Daps (direct access programming system capabilities) which lets the user tap the GE-425's data base from remote locations.

Last year, the General Services Administration awarded for the Corps of Engineers a \$3 million contract to GE for the purchase of installed GE-200 information systems, services, and the rental of a GE-420 time-sharing system.

The equipment covered in the previous contract will be integrated into the new contract.

After fifteen years of going around together... They finally got married.

Now... a Digital X-Y Plotter that Types! TYPAGRAPH is the only computer terminal that marries, into a single mechanism, both precision plotting and standard teleprinter capabilities, and plots and types on the same page! It is no longer necessary to do your typing on a teleprinter and your plotting on a separate plotter.

This long awaited innovation now allows computer terminal users to add plotting capabilities instantly (it is plug compatible with a standard teletypewriter) without the need for additional plotting equipment and difficult-to-use software. And, the TYPAGRAPH offers the time-share user new versatility of performance at a practical cost never before possible.

The TYPAGRAPH is a true X-Y plotter that uses a typewriter printing head instead of an ink stylus. The TYPAGRAPH plots or types in any direction, up, down, right, left. Both the type print head (X axis) and the paper feed (Y axis) are driven by reversible stepping motors. Either motor can be stepped in increments as small as 0.020" and moved as many as fifteen increments by a single command. Graphics are plotted as a series of closely spaced characters. Any character may be selected for plotting. Character spacing in the text mode can be varied between 24 and 120 characters per line with only a single step command for each character. The TYPAGRAPH is also equipped with a paper tape punch/reader and a 10 key rapid entry keyboard for numerical data entry.

Unique software for utilizing the TYPAGRAPH with any existing time share computer system is provided free. The software is written in ASA Fortran. A conversational routine is available for use by the novice with no knowledge of.

Fortran and more sophisticated subroutines are available for use by experienced Fortran programmers. The system and software are designed to require only the 64 character printing sub-set of the USASCII code for complete plotting and typing operation.

The TYPAGRAPH is fully portable, is quieter than a standard office typewriter and is enclosed in an attractive Teakwood cabinet. It can be used anywhere without disturbing nearby workers and will fit any office decor.

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For more information about TYPAGRAPH, ask your time-share company or fill out and return the coupon below.

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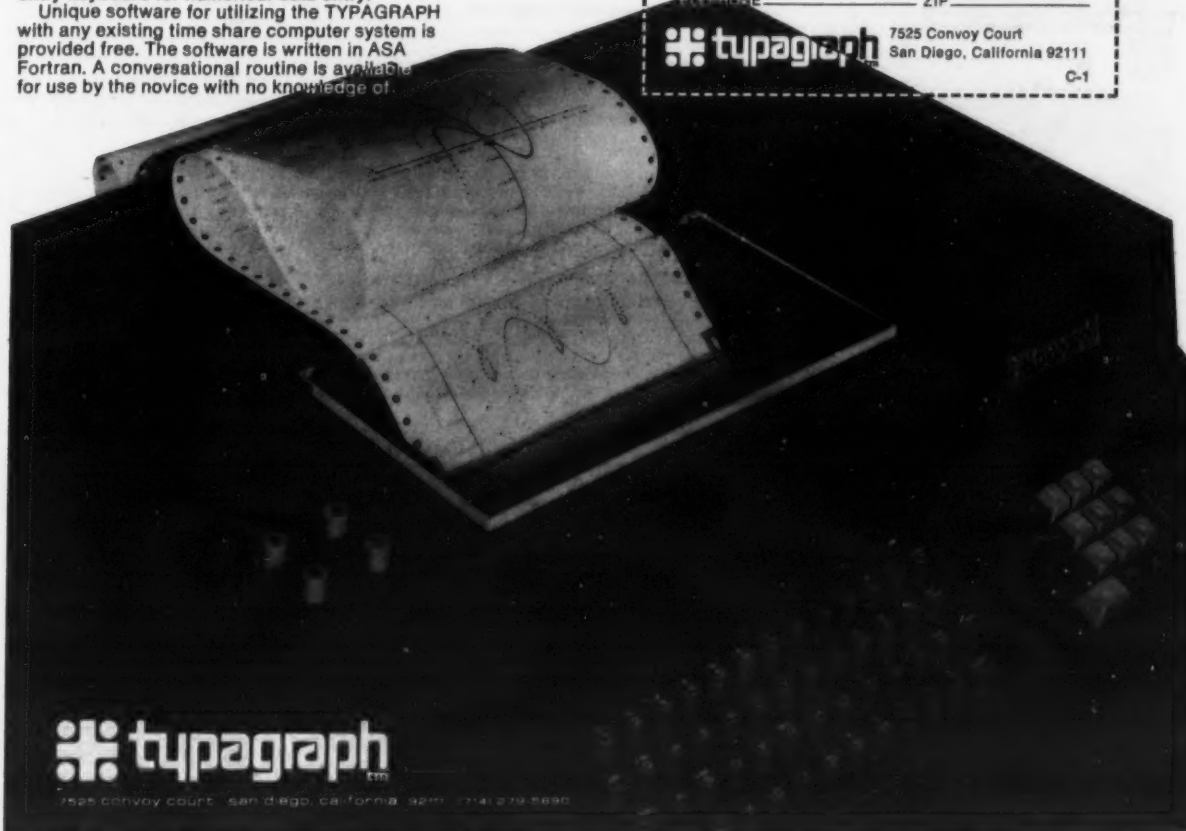
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New Registrations

AUDIO DATA CORP., 831 Via de la Paz, Pacific Palisades, Calif. 90272, a company that develops a compact, portable voice device that, when connected with measuring, computing, or numerical information generating instruments and systems, automatically converts the numerical data of the instrument or systems into a spoken language message, filed to register 150,000 shares of common stock and 75,000 common stock purchase warrants. Proceeds, at \$10 per unit (each unit consisting of two shares and one warrant), intended for further development of Audio Data units, components, production, equipment, and promotional advertising. The underwriter is First Philadelphia Corp., 80 Wall St., New York, N.Y.

KALVAR CORP., 907-909 S. Broad St., New Orleans, La. 70125, a company that manufactures vesicular photographic films, electrostatic papers, microfilming services, and data processing services, filed for a shared registration of 1,950 outstanding shares of common stock. The price is \$170 per share maximum. It has outstanding 280,493 common shares.

CHARRON-WILLIAMS SYSTEMS, INC., 2 N.W. Second St., Miami, Fla., a company that operates three commercial and technical training schools offering secretarial, accounting, paramedical, data processing, and computer programming courses, filed to register 100,000 shares of common stock.

Proceeds, at \$6 per share maximum, intended for advertising, promotion, the purchase of additional medical and language-laboratory equipment and business machines, and acquisition or construction of dormitory or additional classrooms. The underwriter is Butson, Dana, Westerlund, Inc., 120 Broadway, New York, N.Y. 10005.

ALUMINA FERRITE CORP. OF AMERICA, 20739 Dearborn St., Chatsworth, Calif. 91311, a company that manufactures and sells fabricated ferrite pole pieces for computer memory systems and alumina tape guides and head bodies that sell to manufacturers of computers and related data processing equipment, filed to register 180,000 shares of common stock.

Proceeds, at \$6 per share, intended to increase inventories of raw materi-

als, purchase additional equipment and machinery, to finance research and development, and to secure and equip an additional manufacturing facility. The underwriter is Herbert Young & Co., Inc., 160 Broadway, New York, N.Y.

ANDERSON JACOBSON, INC., 2235 Mora Drive, Mountain View, Calif. 94040, a company that designs, manufactures, and sells data communications equipment and remote keyboard-printer data terminals for use as peripheral equipment in computer time-sharing, filed a secondary registration of 660,000 shares of common stock, of which 400,000 are to be offered for public sale by the company and 260,000 (being outstanding shares) by the present holders.

Proceeds, at \$11 per share maximum, intended to retire short- and long-term bank loans; to finance proposed expansion, test equipment, and production tooling; and to finance rental inventories to data terminals and acoustic data couplers. The underwriter is Blair, Wilson & Co., Inc., 155 Sansome St., San Francisco, Calif. 94104.

Itel Doubles '68 Earnings, Revenues in '69 First Half

SAN FRANCISCO — Revenues of Itel Corp. for the quarter ended June 30 increased to \$10,099,000 from \$998,000 a year earlier, and net income after federal tax provisions was \$844,000 as compared with a deficit of \$282,000 a year ago.

President Peter S. Redfield reported revenues for the first six months of 1969 totaled \$17,466,000, up from \$1,438,000 at the 1968 first half.

Net income after taxes for the first six months of 1969 was \$1,493,000, as compared to a deficit of \$463,000 a year earlier.

Redfield noted that the deficit in 1968 reflected start-up ex-

penses for SSI Computer, which began operations in March, 1968.

He also noted that revenues and earnings for the first six months of 1969 were more than double the results for the entire year of 1968.

Per-share earnings were up to 22 cents in the June quarter, as against a loss of 9 cents a year ago, based on the average number of shares outstanding in the respective periods. For the first half of 1969, earnings per share were 39 cents, as compared with a loss of 18 cents for a year earlier.

Redfield commented that Itel's increasing earnings trend will continue as Statistics for Management expands its operations and as the full revenue-generating impact of SSI Computer Corp.'s \$200,000,000 of computer equipment is felt.

Memorex Income Up 52% in Half

SANTA CLARA, Calif. — Record sales and earnings of Memorex Corp. have been reported for the first half of 1969.

Sales were \$35,700,000 for the six-month period ended June 30, 1969, a 40% increase over sales of \$25,500,000 in the first six months of 1968.

Net income after taxes amounted to \$3,073,000, compared to \$2,016,000 for the comparable period last year, an increase of 52%. Earnings per share for the first half of 1969 were 83 cents, compared to 56 cents in 1968.

The outlook for second-half business is good, President Laurence L. Spitters said, but results are expected to show lower percentage increases over those than were shown in the first half.

Evaluation units of the Model 660 disk drive, a large-capacity memory device for use in large computers, were shipped to computer manufacturers who have indicated interest in using this equipment in their systems, and Memorex expects substantial orders to follow their evaluation.

Randolph Up 37% In Net Income

GREENWICH, Conn. — Randolph Computer Corp. reported that net income for the first half of 1969 reached \$2,121,000 on total revenues of \$20,800,000. This was a 37% increase over the \$1,547,000 earned on revenues of \$13,050,000 during the first half of 1968.

Earnings per share increased from 78 to 86 cents in the face of a 24% increase in average shares outstanding.

The chairman of the board, John M. Randolph, stated that "results for this year have of course been adversely affected by the high cost of money."

"As compared with interest rates last year, we estimate that this year's higher rates have cost us about seven cents per share."

OPPORTUNITY

Systems for the New Generation

Friden Division of the Singer Company is expanding its third generation Management Information Systems Staff and is searching for qualified professionals for the following openings:

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Design Programmer

Under immediate supervision, assists more experienced programmers in the analysis, definitions, coding and testing of applications packages, acceptance tests and software offerings for stored program computer products. May also provide software support packages for other Friden EDP products. Reports to Software Development Supervisor.

Senior Systems Programmer

Under general direction, designs microprogram logic, basic compilers, utilities and programming languages for Friden EDP products based upon hardware specifications. Works at the highest level of all technical phases of programming in providing the more complex software and in giving occasional guidance to less experienced programmers classifications. Reports to Software Development Supervisor.

Communications Systems Analyst

Under the general direction of the Applications Engineering Supervisor and coordination of the Data Communications Product Line Manager, provide informational and technical interface for use of Friden Communications products in conjunction with all commonly used stored program computers offered by the various manufacturers. Participate in planning for new products by providing computer software/hardware facts and considerations to the Product Line Manager and Product Planning Specialists.

Senior Applications Engineer

Under general direction, formulates hypothetical solutions to business, scientific and/or engineering problems as required by the Product Line Manager. Prepares procedures and programs for problem solution, software package offerings and language testing. Provides the "real world" interface in software development and gives guidance to less experienced programmer classifications. Reports to Applications Engineering Supervisor.

Systems Writer

Under the general supervision of the Technical Documentation Supervisor, prepare accurate and complete written documents, suitable for publication, that describe and detail the software, higher level languages and simulators used with Friden EDP equipment and other major computers.

All openings are in our San Francisco Bay Area offices in San Leandro, California. Please forward your resume, in complete confidence, to Mr. G. E. Hall, 2350 Washington, Dept. 9T, San Leandro, California. We are an equal opportunity employer. A Plan for Progress Company.

SINGER
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Scientific Control Corp. Sells 100 DCT 132s to Customer

DALLAS — Scientific Control Corp. has sold 100 of its DCT-132 remote data communications terminals valued in excess of \$2.4 million to one customer.

William C. Lee, president of the rapidly expanding Dallas computer manufacturer and marketer, said the customer requested his company's name be withheld for competitive reasons. This sale, Lee added, brings the Scientific Control aggregate backlog to \$17.7 million.

"With this \$2.4-million sale and the \$2.27-million contract announced July 25, we believe the confidence exhibited earlier when SCC projected sales of more than \$20 million for fiscal

1970 is wholly justified," the Scientific Control president commented.

"As these two sales demonstrate, our forecast of tripling sales from 1969's \$7-million level was extremely conservative."

Since mid-June, Scientific Control has announced sales to four customers of more than \$11.2 million in digital computers and computer communications equipment.

The DCT-132, an internally programmable remote data communications terminal, is compatible with all time-share and other computers now in use throughout the nation, owing to its internal programming feature, according to the company.

Orders and Installations

A computer-driven display system that will help determine the best method of presenting a large variety of information in easily readable form to flight crews aboard supersonic jet transports has been delivered to the Boeing Co. by Sanders Associates, Inc. The advanced data display system, ADDS/900, will be used in Boeing's research programs at its SST simulation facility to explore new techniques for providing flight crews with information not furnished by conventional aircraft instruments.

Redcor Corp. of Canoga Park, Calif., has been selected by Texas Instruments' science services division, Dallas, to supply two RC 70 computer systems to its Geosciences Group.

General Electric GE-PAC 4020 process computers have been ordered by the Big Brown Steam Electric Station in Freestone County, Texas, for monitoring, logging, and alarm functions for their two initial generators and by Westvaco for control of the Kamy continuous digester in its new pulp and paper mill in Wickliffe, Ky.

Wescal Data Systems, a division of Wescal Industries, Inc. of El Segundo, Calif., has delivered the first of 50 Wescal 30-30 data terminal units to Host International, Inc. The terminals will be used to gather financial and other information through phone lines to be processed by the Host computer center.

An NCR Century 200 system has been requisitioned by Nevada's Washoe County for general tax purposes and use by law enforcement agencies and the county auditor.

A Universal Systems, Inc. network control processor has been sold to Sci-Tek Computer Center, Inc. of Wilmington, Del., to act as the communications "front-end" for the large-scale computer used in Sci-Tek's computer service bureau.

British European Airways has selected DEC's PDP-10 computer for use in a management information system currently under development. The system

is designed for management planning and operations research models upon which decisions could be made.

The following have ordered Honeywell Model 120 computer systems for general office purposes: United Associated Groceries, Inc., Woburn, Mass.; Central Grocers Cooperative, Inc., Franklin Park, Ill.; Pepsi-Cola Metropolitan Bottling Co., Royal Oak, Mich.; and the Holbrook Grocer Co., Keene, N.H.

Shulman Freight, an air-freight forwarder, has installed a GE-405 information system to handle on-line rating of goods to be shipped. The system will receive communications from 13 major centers in the U.S.

British Petroleum of England has ordered a \$3.6-million Univac 1108 computer system to process linear programming work.

Astrodata's United Kingdom affiliate, Redifon-Astrodata, Ltd., has received an order valued at more than \$100,000 from the British Ministry of Technology for a Ci-5000 Analog/Hybrid Computing System. The computer will be installed at the Royal Radar Establishment in Malvern, Worcester, England, for use in research and development of guided weapons systems.

AMF Western Tool Division, Des Moines, Iowa, has ordered a Honeywell Model 110 magnetic tape system for accounts payable/receivable, inventory, general ledger, invoicing, labor distribution, and shop performance.

SYS Associates, Inc. has sold an SYS-2113 data acquisition and control system, a proprietary unit that converts an IBM-1130 to a real-time data acquisition computer, to the government systems division of Motorola, Inc. It is to be used for a project in which weather data is gathered from remote stations.

The Farmers & Merchants Bank of Menomonee Falls, Wis., has ordered a Burroughs B340 computer to handle work now sent to an outside data processing service center.

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|------------|-------------------|--------------|-------------------|
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| Sept. 10 | Aug. 29 | Nov. 5 | Oct. 24 |
| Sept. 17 | Sept. 5 | | |
| Sept. 24 | Sept. 12 | Nov. 12 | Oct. 31, 1969 |
| Oct. 1 | Sept. 19 | FJCC Preview | |
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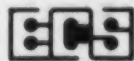
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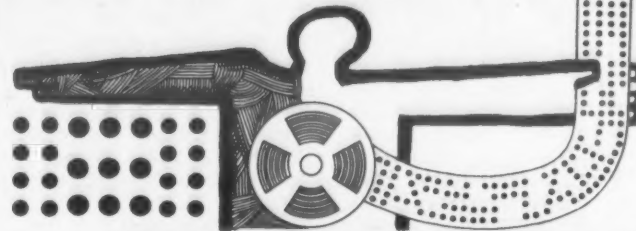
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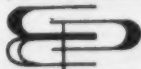


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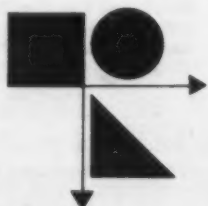
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